SECTION 07 52 00
MODIFIED BITUMINOUS MEMBRANE ROOFING
STAUNTON HEALTH DEPARTMENT

PART 1 GENERAL

1.1 SUMMARY OF WORK

A. Roof Replacement Scope of Work
   1. Removal of the existing spray foam roof system to the concrete deck including all insulation, flashings and terminations, metal coping, and edge metal.
   2. Installation of new tapered insulation in insulation adhesive.
   3. Installation of new high density cover board in insulation adhesive.
   4. Installation of new torch applied two ply roof system with mineral cap sheet.
   5. Installation of new torch applied two ply flashings and terminations.
   6. Installation of new shop fabricated coping caps and edge metal.

1.2 SECTION INCLUDES

A. Torch Applied 2-Ply Asphalt Roofing

B. Roof Insulation

C. Accessories.

D. Edge Treatment and Roof Penetration Flashings.

1.3 REFERENCES

A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.

C. ASTM D 412 - Tensile Test on Rubber and Elastomers.

D. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.

E. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

F. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.

G. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

H. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

I. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings

J. Factory Mutual Research (FM): Roof Assembly Classifications.

K. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.

L. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.

M. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.

N. ASCE 7, Minimum Design Loads for Buildings and Other Structures

O. UL - Fire Resistance Directory.

P. FM Approvals - Roof Coverings and/or RoofNav assembly database.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

A. Perform work in accordance with all federal, state and local codes.

B. 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) IV
3) Importance Factor of:
a) 1.0
4) Wind Speed: 122 mph
5) Exposure Category:
a) C.
6) Design Roof Height: 20 feet.
7) Minimum Building Width: 115 feet.
8) Roof Pitch: ¼” :12”.
9) Roof Area Design Uplift Pressure:
a) Zone 1' Interior Field of Roof 25.4 psf
b) Zone 1 - Field of roof 39.5 psf
c) Zone 2 - Eaves, ridges, hips and rakes 50 psf
d) Zone 3 - Corners 65.8 psf
2. Live Load: Not to exceed original building design.
3. Dead Load:
a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.

1.5 SUBMITTALS

A. To be provided to the owner for approval prior to commencing roof work.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation instructions.

C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor retarder, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.

D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load

requirements before Work begins.

E. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.

G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6 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 contractor by the manufacturer.

D. For torch applications, installer must be NRCA - CERTA trained and must utilize CERTA compliant application methods.

E. 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.

F. Manufacturer's Field Supervision: A representative of the roof system manufacturer must be present during the roof system installation per Section 1.7 of this specification.

G. 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.

H. 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 Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7 MANUFACTURER’S INSPECTIONS

A. The roof system manufacturer must provide the following during all phases of the roofing work.
   1. Onsite inspections daily during the first 7 days of work.
   2. Onsite inspections 3 days per week for the remainder of the work.
   3. Inspections must be provided by a full-time employee who is employed directly by the manufacturer.
   4. Manufacturer to provide weekly progress reports to the owner with photographs of the

work completed, weekly weather, and any corrections made during the work.

5. Provide a manufacturer's Certification letter, stating that the roof system manufacturer will provide the inspection services as required by this specification. This letter must be signed and notarized by an officer of the manufacturing company.

1.8 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to commencing roof work.

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 Owner.

1.9 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 HP and 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 Owner.

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.

1.10 COORDINATION

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

1.11 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.

1.12 WARRANTY

A. Upon completion of the Work, provide the Manufacturer's written and signed Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due to defective material or workmanship, 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.

1. Warranty Period: 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. 3 years from date of acceptance.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. When a particular trade name or performance standard is specified, it shall be indicative of the minimum standard required. Product names for the materials used in this section shall be based on performance characteristics of the modified bitumen roof system manufactured by The Garland Company, Cleveland, OH (434-953-0531), and shall form the basis of the contract documents.

B. This specification is based on the performance characteristics of the system identified herein. Any proposed alternate systems, specified or not, must meet or exceed the following listed characteristics and be submitted for approval. Additionally, all Warranty Criteria (1.12), Design and Performance Criteria (1.4), and Manufacturer's Inspections (1.7) must be met. Failure of a system to meet all requirements of this specification will result in forfeiture of the bid award.

C. Any item or materials submitted as a substitution to the basis of design manufacturer specified, must be submitted by the bidding Contractor and must comply in all respects as to the quality and performance of the brand name specified. The Owner shall be the sole judge as to whether or not an item submitted as a substitute is truly equal. Should the Contractor choose to submit a substitute product, he shall assume all monetary or other risk involved, should the Owner find the substitution unacceptable.

D. Provide primary products, including each type of roofing membrane, base roofing ply, base flashing ply, modified membrane flashing ply, modified membrane roof ply, and miscellaneous flashing materials from a single source roof manufacturer. Provide secondary products (insulation, mechanical fasteners, etc.) only as recommended by the roof manufacturer of primary products for use with the roof system specified.

E. The following manufacturers are acceptable, providing they meet these specifications and the minimum standards stated.

1. The Garland Company, Inc. (Basis of Design)
2. Approved Equal

2.2 SHEET MATERIALS

A. Base (Ply) Sheet: One ply bonded to the prepared substrate torch applied.

1. HPR Torch Base
2. OR approved equal

B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate torch applied.

1. StressPly IV Plus Mineral:
2. Or approved equal

C. Interply Adhesive:

1. NA

D. Intumescent primer for wood components at perimeters, flashings and penetrations:

1. Pro-Stop FR:
2. Or approved equal

E. Flashing Base Ply: One ply bonded to the prepared substrate torch applied.
1. HPR Torch Base:
2. Or approved equal.

F. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate torch applied.
1. StressPly IV Plus Mineral:
2. Or approved equal.

2.3 ROOF INSULATION

A. Roof Insulation
1. Qualities: Rigid closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
2. Board Size: Four feet by four feet (4' x 4') or Four feet by eight feet (4' x 8').
3. Thickness: R30 Average ¼" : 12 Tapered System
4. Strength: Minimum 20 psi
5. Source of Supply: The Garland Company or Approved Equal.

B. Cover Boards
1. Qualities: Nonstructural, water resistant, fiber-reinforced gypsum roof board.
2. Board Size: Four feet by four feet (4' x 4').
3. Thickness: ½"
4. Strength: Minimum 900 psi
5. Source of Supply: Georgia Pacific Densdeck Prime

2.4 ACCESSORIES

A. Insulation Adhesive: Insul-Lock HR or approved equal.
1. Cold applied, highly elastomeric, high rise, fast setting, two-component with a one step application mechanism, VOC compliant, foamable insulation adhesive that contains no solvents and sets in minutes. Designed to adhere approved insulation to insulation and structural decks.

B. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless-steel nails shall be used with aluminum; and stainless-steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.

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. Walkway Pads: As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on roof top surface and provide a durable system compliant non-slip walkway.

2.5 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

A. Shop Fabricated Edge Metal: Snap-On Fascia Cover and Splice Plate.
1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 24-gauge,

chemically treated, commercial or lock-forming quality

B. Edge Metal Finishes:
   1. 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 0.3 mils.
         7) Color: Standard Colors. TBD by Owner.

C. 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.

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. Retrofit Drains: A factory fabricated fixture (RetroDrain with Aluminum Dome), installed to replace a drain on an existing roof. The fixture is installed from the roof surface and provides a watertight connection to the existing plumbing and roofing system. The fixture is designed so that it may be installed without removing the existing drain body and plumbing.
   1. Acceptable Manufacturers: OMG Roofing Products; Hercules or approved equal.

H. Liquid Flashing - Tuff-Flash Plus LO or approved equal. 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: 650 psi.
   2. Elongation, ASTM D 412: 325%
   3. Density @77 deg. F 8.3 lb/gal typical.

I. Fabricated Flashings: 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.

J. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim. 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 Owner 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.

B. Re-Roofing Applications:
   1. Remove existing roof flashings from curbs and parapet walls down to the surface of the roof. Remove existing flashings at roof drains and roof penetrations.
   2. Remove all wet, deteriorated, blistered or delaminated roofing membrane or insulation and fill in any low spots occurring as a result of removal work to create a smooth, even surface for application of new roof membranes.
   3. Install new wood nailers as necessary to accommodate insulation/recovery board or new nailing patterns.
   4. Existing roof surfaces shall be primed as necessary with asphalt primer meeting ASTM D 41 and allowed to dry prior to installing the roofing system.

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 ROOF INSULATION

A. Roof Insulation: Roof insulation is specified in Section 2.2.
   1. The surface must be thoroughly cleaned using compressed air, vacuum equipment or hand/power brooms to remove dust, loose dirt or debris.
   2. Insulation thicker than 2.5” shall be installed in multiple layers. All joints between layers should be staggered when multiple layer of insulation is installed.
   3. Insulation shall be kept dry at all times. Install only as much insulation as can be covered with the completed roofing membrane before the end of the day's work or prior to onset of inclement weather.
   4. Edges shall butt tightly, and all cuts shall fit neatly against adjoining surfaces to provide a smooth overall surface. Gaps of greater than 1/4-inch width shall be filled with insulation.
   5. Install tapered insulation around roof drains and penetrations to provide adequate slope for proper drainage.
   6. 4’ X 4’ tapered sumps shall be installed at all drain areas.
   7. Adhered insulation shall be installed in accordance with code and insurance requirements for the applicable geographic zone with the required number and type of fasteners and plates.
   8. The insulation shall be fastened per the following spacing and patterns.
      a. Zone 1: 12” O.C.
      b. Zone 2: 12” O.C.
      c. Zone 3: 12” O.C.

B. Roof Cover Boards: Roof cover boards are specified in Section 2.2.
   1. The surface must be thoroughly cleaned using compressed air, vacuum equipment or hand/power brooms to remove dust, loose dirt or debris.
   2. Edges shall butt tightly, and all cuts shall fit neatly against adjoining surfaces to provide a smooth overall surface.
   3. Apply specified insulation adhesive directly to the newly installed polyisocyanurate insulation in a ribbon pattern. Immediately place the recovery board into the wet adhesive. Do not slide the recovery board into the adhesive. Do not allow the adhesive to skin over. Briefly step each board into place to ensure contact with the adhesive. Substrates with irregular of uneven surfaces may prevent the insulation from making positive contact with the adhesive. In these cases, relief cuts or a temporary weight may be required.
   4. The cover boards shall be adhered per the following spacing and patterns:
      a. Zone 1: 12” O.C.
      b. Zone 2: 12” O.C.
      c. Zone 3: 12” O.C.

3.5 INSTALLATION TORCH APPLIED 2-PLY ASPHALT ROOFING

A. Base Ply: Install torch base sheet to a properly prepared substrate. Shingle in proper direction to shed water on each area of roofing. If wood components are present at

perimeters, flashings and penetration locations, an intumescent primer must be applied to the wood components prior to the application of the torch applied cap membrane. A self-adhering base sheet, intended for use with torch-applied cap sheets must also be applied around all perimeters, flashings, curbs and penetrations.

1. Lay out the roll in the course to be followed and unroll 6 feet (1.8 m).
2. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to insure a proper bond.
3. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
4. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
5. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to insure a smooth, tight seal.
6. Extend underlayment 2 inches (50 mm) beyond top edges of cants at wall and projection bases.
7. Install base flashing ply to all perimeter and projections details.

B. Modified Cap (Ply) Sheet: Over torch base sheet underlayment, lay out the roll in the course to be followed and unroll 6 feet (1.8 m). Stagger seams over the torch base sheet seams.

1. Using a roofing torch, heat the surface of the coiled portion until the burn-off backer melts away. At this point, the material is hot enough to lay into the substrate. Progressively unroll the sheet while heating and press down with your foot to ensure a proper bond.
2. After the major portion of the roll is bonded, re-roll the first 6 feet (1.8 m) and bond it in a similar fashion.
3. Repeat this operation with subsequent rolls with side laps of 4 inches (101 mm) and end laps of 8 inches (203 mm).
4. Give each lap a finishing touch by passing the torch along the joint and spreading the melted bitumen evenly with a rounded trowel to ensure a smooth, tight seal.

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 06 11 00.

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.
5. All wood blocking, nailers, and cant strips, must be primed with an intumescent primer prior to the application of the base sheet.

E. Wood Component Intumescent Primer: Intumescent primer shall be applied to all wood components within perimeter conditions, flashing and penetrations, such as wood nailers, blocking sheathing, etc.

1. Before and during primer application, the substrates' surfaces shall be dry, clean and free from loose debris, dust, dirt, grease, oil, and all prior coating materials, such as

paint, stains and sealers. The substrate shall not have, nor have been exposed to, treatments, chemicals, coatings, etc. prior to the application of the primer

2. Prior to application of primer, moisture content of the substrate must be verified to less than 16%
3. Apply intumescent at a rate of 1/2 gallon per 100 square feet (200 square feet per gallon)
4. Allow primer to cure prior to application of the base sheet and/or flashing plies.

F. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.

G. 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.

H. Flashing Base Ply: Seal all 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.

1. Prepare all walls, penetrations, expansion joints, and other surfaces to be flashed with asphalt primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
2. Adhere modified flashing base to the underlying base flashing ply with specified flashing ply adhesive. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
3. Solidly adhere the entire sheet of flashing membrane to the substrate. Tops of all flashings that are not run up and over curb shall be secured through termination bar 6 inches (152 mm) o.c. and sealed at top.
4. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work.
5. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work. When using mineralized cap sheet all stripping plies type IV felt / VersiPly 40 shall be installed prior to cap sheet installation.

I. Flashing Cap Ply: Install flashing cap 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 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 o.c. and covered with an acceptable counter flashing.

9. Seal all vertical laps of cap flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.

J. Roof Walkways: Provide walkways in areas indicated on the Drawings.

3.6 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Raised Metal Edge:
1. Inspect the nailer to ensure proper attachment and configuration.
2. Run base ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at 8 inches (203 mm) o.c.
3. Install continuous cleat and fasten at 6 inches (152 mm) o.c.
4. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailer every 3 inches (76 mm) o.c. staggered.
5. Prime metal edge and allow to dry. Do not prime for Green-Lock System lightly sand metal to improve bond.
6. Strip in flange with base flashing ply covering entire flange in bitumen with 6 inches (152 mm) on to the field of roof. Assure ply laps do not coincide with metal laps.
7. Install a second ply of thermoplastic cap flashing ply heat welded over the thermoplastic cap ply, 9 inches (228 mm) on to the field of the roof.

B. Expansion Joint:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Chamfer top of curb. Prime vertical curb and allow to dry.
2. Mechanically attach wood cant to expansion joint nailers. Run all base field plies over cant a minimum of 2 inches (50 mm).
3. Install compressible insulation in neoprene cradle.
4. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
5. Then install thermoplastic cap field ply run over the base flashing ply in bitumen or foam adhesive.
6. Install the thermoplastic flashing ply in bitumen or foam over the base flashing ply, 9 inches (228 mm) on to the field of the roof.
7. Install pre-manufactured expansion joint cover. Fasten sides at 12 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.

C. Area Divider:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical curb at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all base field plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to the base field ply and set in bitumen.
4. Then install thermoplastic cap field ply run over the base flashing ply in bitumen or foam adhesive.
5. Install the thermoplastic flashing ply in bitumen or foam over the base flashing ply, 9 inches (228 mm) on to the field of the roof.
6. Install pre-manufactured cover. Fasten sides at 24 inches (609 mm) o.c. with fasteners and neoprene washers through slotted holes. Furnish all joint cover laps with butyl tape between metal covers.

D. Exhaust Fan:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical and allow to dry.
2. Set cant in bitumen. Run all base field plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to the base field ply and set in bitumen.

4. Then install thermoplastic cap field ply run over the base flashing ply in bitumen or foam adhesive.
5. Install the thermoplastic flashing ply in bitumen or foam over the base flashing ply, 9 inches (228 mm) on to the field of the roof.
6. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.

E. Retrofit Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
2. Run complete roof system plies over drain. Cut out plies inside drain bowl.
3. Set 4lb. lead flashing (thirty (30) inch square minimum) in ¬º inch bed of mastic. Run lead into drain a minimum of two (2) inches. Prime lead at a rate of one hundred (100) square feet per gallon and allow to dry.
4. Install base flashing ply (forty (40) inch square minimum).
5. Install modified membrane (forty-eight (48) inch square minimum) in the specified cold applied flashing adhesive. Stop both flashings plies short of the clamping ring and seal edge of modified flashing plies with a three-course application of SILVER-FLASH aluminized mastic and reinforcing mesh.
6. Install new retrofit drain per the manufacturer's specifications.
7. Remove drain plug and install strainer.
8. In an 8’ x 8’ square around each drain install two coats of white silicone coating with a bleed blocking primer. The area to be taped off prior to coating to create a clean outline.

F. Surface Mounted Counterflashing:
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. Install base flashing ply covering wall 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. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
6. Secure counterflashing set on butyl tape above flashing at 8 inches (203 mm) o.c. and caulk top of counterflashing.

G. Manufactured Wall Panel W/Modified Roof/Flashing (Slip Flashing):
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
3. Install base flashing ply covering wall 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 manufacturer's standard hat channel into the top of the modified membrane to act as a termination bar.
6. Install hat channels vertically spaced up the wall and fastened in accordance with the wind uplift calculation requirements.
7. Install the uppermost hat channel at the bottom edge of the coping cap. Insert rigid insulation between the hat channels. Place manufacturer's standard seam tape on top of all hat channels.
8. Fasten the first manufactured wall panel vertically plumb and fasten every 6 inches (152 mm) o.c.

9. Install adjoining panels by engaging the opposing interlocking seam and fastening as described above.
10. Complete inside and outside corners by installing prefabricated corners or job site breaking a full width panel to accommodate the corner, so that the sides engage the lock of the panels to the corner areas.
11. Trim excess seam tape and seam raw edges with manufacturer's recommended sealant.
12. Fasten slip flashing to existing coping cap with a waterproof rivet every 24 inches (609 mm) o.c. to act as a counterflashing over the manufactured wall panel.

H. Pitch Pocket:
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.

I. Liquid Flashing:
1. Mask target area on roof membrane with tape.
2. Clean all non-porous areas with isopropyl alcohol.
3. Apply 32 wet mil base coat of liquid flashing over masked area.
4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
5. Apply 48-64 wet mil topcoat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.
6. Apply minerals immediately or allow the liquid flashing material to cure 15-30 days and then install reflective coating.

3.7 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.

3.8 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.

3.9 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Contractor, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. The roofing system manufacturer and/or Owner reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The thermographic scan shall be provided by the Roofing Contractor at a negotiated price.

D. If core cuts verify the presence of damp or wet materials; the Roofing Contractor shall be required to replace the damaged areas at his own expense.

E. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

F. Notify the Owner and roofing system manufacturer upon completion of corrections.

G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

END OF SECTION