

## SECTION 07 52 00 - MODIFIED BITUMINOUS MEMBRANE ROOFING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section Includes administrative and procedural requirements for submittals required for the performance of the Work, but not limited to, including the following:
  - 1. Cold Applied 2-Ply Modified Roof System.
  - 2. Thermal Insulation.
  - 3. Insulation Accessories.
  - 4. Edge Treatment and Roof Penetration Flashings.
- B. Related Sections: The following Sections contain requirements that relate to the Section:
  - 1. All provided Sections.
- C. Comply with all OSHA and Cuyahoga County regulations.
- D. Tear off all roofing materials to the metal deck.
  - 1. Core cut = flat metal deck + fiberglass insulation + coal tar BUR & gravel + ISO insulation + perlite cover board + BUR and gravel + expanded polystyrene + white membrane.
- E. Mechanically attach 4' x 4', ½" gypsum board using an approved fastener in each corner.
- F. Fully adhere the specified temporary roof/vapor barrier per the manufacturer's requirements.
- G. Raise all mechanical units a minimum of 8 inches above the completed roof surface.
- H. Mechanically attach 2 layers of 2.2" polyisocyanurate insulation + a 1/8" tapered system using
- I. Install a 2-ply modified system throughout using type III hot asphalt.
- J. Install a 2-ply modified flashing system throughout.
- K. Flood coat the entire roof surface with cold process coal tar at the rate of 5 gallons per 100 square feet. Immediately embed 425 to 450 pounds of #8, silica, wash grade pea gravel.
- L. Aluminize all exposed modified membrane.
- M. Install ANSI-Spri metal edge system throughout.
- N. Replace the safety rail around the roof hatch.

#### 1.3 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Design Requirements:
- C. Uniform Wind Uplift Load Capacity
  - 1. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
    - a. Design Code: ASCE 7, Method 2 for Components and Cladding.
    - b. Importance Category:

- 1) IV
  - c. Importance Factor of:
    - 1) 1.0
  - d. Wind Speed: 121 mph
  - e. Exposure Category:
    - 1) B.
  - f. Roof Area Design Uplift Pressure:
    - 1) Zone 1 - Field of roof 30.1 psf,
    - 2) Zone 2 - Eaves, ridges, hips and rakes 38.2 psf, width 3'-8".
    - 3) Zone 3 - Corners 50.2 psf, length 10'-10".
- D. Live Load: 20 psf, or not to exceed original building design.
- E. Dead Load:
- 1. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.

#### 1.4 SUBMITTALS

- A. Per the project requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation of 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 barrier, 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. 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.
- F. Submit certificates that contractor is an approved installer of the specified system.

#### 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.

#### 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 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 and below 80 degree F. Area of storage shall be constructed for flammable storage.

#### 1.8 DISCLOSURE OF MATERIALS/ALTERNATE MANUFACTURERS

- A. Alternate Manufacturers: Alternate Manufacturers must meet all Design Performance and Warranty requirements. If the bidder wishes to propose an alternate manufacturer and/or material than that specified, the following manufacturer criteria must be submitted by the bidding contractor to the Owner's Representative and Owner for approval. Alternate systems will not be considered for approval unless it is submitted by the bidding contractor and each of these items has been submitted for review at least 10 business days prior to bid opening:
  - 1. Tests shall have been made for identical systems within the ranges of specified performance criteria.
  - 2. Empirical calculations for roof performance shall only be acceptable for positive loads.
  - 3. A list of at least five (5) jobs where the proposed alternate material was used under similar conditions. These jobs shall be located within fifty (50) miles of this project. Each job must

be at least five (5) years old, and each must be available for inspection by the Owner's Representative and Owner.

4. All products must be in accordance with the Health, Safety and Environmental Control (HSE) Regulations, e.g., No asbestos materials, no harmful solvent release materials, etc. will provide the same guarantee for substitution as for the product and method specified.
  - a. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.
  - b. Waives all claims for additional cost related to substitution, which consequently become apparent.
  - c. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
  - d. Will reimburse the Owner for all redesign cost by the Owner's Representative for accommodation of the substitute.
5. Manufacturer's Certificate: The manufacturer must provide an audited financial statement for the previous fiscal year that will demonstrate a current ratio of 5:1 (current assets to current liabilities). The audited financial statement must be supported by an affidavit from a third party. Manufacturer must not have been in Chapter 11 bankruptcy during the last five (5) years.
6. A written statement from the manufacturer stating that they will provide the building Owner with daily site inspections by an employee of the company.
7. A written statement from a corporate officer of the manufacturing company stating that he or she has reviewed the specifications and confirms that the proposed system meets or exceeds all performance requirements listed as well as meets the panel size, gauge, weight, clip design, sealant design, uplift pressures, and height of the vertical seam.
8. A copy of manufacturer's 30-year watertight warranty. Warranty must be a single-source manufacturer's waterproofing warranty and must include coverage for all trim, flashing, and penetrations associated with this modified roof system. Warranty must be from the same manufacturer as the pre-manufactured edge metal edge system.
9. Submit a certified copy of the roofing manufacturer's ISO 9001:2008 compliance certificate.
10. Proof that the manufacturer has been in business for a minimum number of years equal to the warranty period required for this project.

- B. The Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed or alternate roofing systems or materials that have met ALL specified requirement criteria.

#### 1.9 COORDINATION

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

#### 1.10 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.

#### 1.11 MANUFACTURER'S INSPECTIONS

- A. Keep the Owner informed as to the progress and quality of the work observed.
- B. Provide daily inspections with pictorial reports to the Owner, Architect, and other predetermined parties. The inspection must be made by an employee of the manufacturer. The report must be sent the same day as the inspection or weekly per the Owner's/Architect's request.
- C. Contractor must provide a Manufacturer's Certification letter that the roof system manufacturer will provide on-site inspections from an employee of the manufacturer on a daily basis. The letter must state that the manufacturer will provide annual inspections throughout the life warranty at no additional cost. The Owner has the right to hire an inspector of their choosing if the inspection

requirements are not met. The contractor will be back charged for this service at a rate not to exceed \$500 per inspection.

#### 1.12 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.
  - 2. Wind Rating
    - a. 90 MPH
- 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 MANUFACTURERS

- A. Basis of Design: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: [www.garlandco.com](http://www.garlandco.com).
- B. Comparable products meeting the basis of design requirements and as deemed acceptable by Owner.

#### 2.2 2-PLY MODIFIED ROOF SYSTEM

- A. Vapor Barrier: One ply fully adhered to the mechanically attached gypsum board in strict compliance with the membrane manufacturer's requirements.
  - 1. Firestone V-Force
  - 2. Vap Air Seal 725 TR
  - 3. Sika/Sarnafil – Sarnavap Self Adhered
- B. Interply Adhesive: Type III hot asphalt.
- C. Field Base Ply:
  - 1. Stress Base 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. @ 73.4 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
    - b. Tear Strength, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
    - c. Elongation at Maximum Tensile, ASTM D 5147
      - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4.0% XD 4.0%
    - d. Low Temperature Flexibility, ASTM D 5147
      - 1) Passes -40 deg. F
- D. Flashing Base Ply:
  - 1. HPR Tri-Base Premium: 60 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing membrane with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147
    - a. Tensile Strength, ASTM D 5147

- 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 330 lbf/in XD 330 lbf/in
- b. Tear Strength, ASTM D 5147
  - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 550 lbf XD 550 lbf
- c. Elongation at Maximum Tensile, ASTM D 5147
  - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 7% XD 9%
- d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F

E. Field & Flashing Cap Ply:

1. Stress Ply Plus: 105 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing membrane incorporating recycled rubber reinforced with a fiberglass and polyester scrim. ASTM D 6162, Type II Grade S.
  - a. Tensile Strength, ASTM D 5147
    - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
  - b. Tear Strength, ASTM D 5147
    - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
  - c. Elongation at Maximum Tensile, ASTM D 5147
    - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
  - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F

F. Gar Mesh: 3-coursing reinforcing mesh:

G. Surfacing:

1. Black-Knight Cold: Coal Tar protective roof coating; heavy-bodied, fiber reinforced, cold process polymer modified having the following characteristics.
  - a. Weight/gallon 9.0 lbs./gal
  - b. Solids by weight 87%
  - c. Viscosity; Brookfield Heliopath, 2.5 rpm 120,000 cPs
  - d. #8 wash, silica, wash grade pea gravel

2.3 THERMAL INSULATION:

A. Thermal Insulation Properties and Approved Insulation Boards.

1. Rigid Polyisocyanurate Roof Insulation; ASTM C1289:
  - a. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
  - b. Thickness: 2 layers of 2.2 equaling R-25
  - c. R-Value: Minimum 5.7 per 1 inch.
  - d. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1.
  - e. Acceptable Products:
    - 1) ENRGY-3; Johns Manville
    - 2) Hytherm; Dow
    - 3) EnergyGuard; GAF
    - 4) Approved Equivalent
2. Tapered Polyisocyanurate Roof Insulation; ASTM C1289:
  - a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
  - b. Thickness: 1/8" per foot
  - c. Saddles & Crickets minimum Tapered Slope: 1/4"
  - d. Sumped Drains: 8' x 8' with a 1/4" taper
  - e. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1
  - f. Acceptable Products:
    - 1) ENRGY 3; Johns Manville
    - 2) EnergyGuard; GAF
    - 3) Approved Equivalent

3. High Density Fiberboard Roof Insulation, ASTM C208
  - a. Qualities: Rigid, composed of interlocking fibers factory blended treated with asphalt on all sides.
  - b. Board Size: Four feet by four feet (4'x4').
  - c. Thickness: One half (1/2) inch.
  - d. Compliances: UL, WH or FM listed under Roofing Systems.
  - e. Acceptable manufactures:
    - 1) Blue Ridge; Celotex
    - 2) Temple Island
    - 3) GAF Building Materials
    - 4) Georgia Pacific
    - 5) Approved Equivalent

#### 2.4 INSULATION ACCESSORIES

- A. Fiber Cant and Tapered Edge Strips: Non combustible performed rigid insulation units of sizes/shapes indicated, matching insulation board of perlite or organic fiberboard as per the approved manufacturer.
  1. Acceptable Manufacturers:
    - a. The Garland Company, Inc.
    - b. Celotex
    - c. Johns Manville
    - d. GAF
    - e. Approved Equivalent
- B. Protection Board: Pre-molded semi-rigid asphalt composition board one half (1/2) inch.
- C. Roof Board Joint Tape: Six (6) inches wide glass fiber mat with adhesive compatible with insulation board facers.
- D. Roof Deck Insulation Adhesive: Type III hot asphalt
- E. Non-Combustible Peel and Stick Sheet Base Sheet
  1. 92 mils, non-woven polyester
  2. Top Surface: Polyolefin film, Bottom Surface: Self-adhered with release film
  3. Paek load @ 73.4 degrees, 85MD, 65XD
  4. Tear strength @ 73.4 degrees, 125MD, 85XD
  5. Low Temp Flex -15 degrees
- F. Fasteners: Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
  1. Factory Mutual Tested and Approved with three (3) inches coated disc for I-90 rating, length required to penetrate metal deck one inch.

#### 2.5 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Pre-Manufactured Edge Metal: R-Mer Force Flash-less Snap-On Fascia Cover and Splice Plate.
  1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 22-gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
- B. Pre-Manufactured Coping Cap: R-Mer Edge Coping Cap Cover and Splice Plate.
  1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 22-gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
- C. Pre-Manufactured Edge Metal: R-Mer Force Flash-less Snap-On Fascia Extruded Base Anchor and Components.
  1. Base Anchor: 6005A-T61 extruded aluminum.
  2. Compression Seal for top of anchor: TPE thermoplastic elastomer.

3. Sealant for Flange: Green-Lock Sealant XL: Single-component high performance 100% solids, interior and exterior polyether joint sealant.
- D. Pre-Manufactured Coping Cap: R-Mer Edge Coping Chairs
  1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
- E. Pre-Manufactured 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.
    - b. Pencil Hardness: ASTM D3363, HB-H / NCCA II-2.
    - c. Bend: ASTM D-4145, O-T / NCCA II-19
    - d. Cross-Hatch Adhesion: ASTM D3359, no loss of adhesion
    - e. Gloss (60 deg. angle): ASTM D523, 25+/-5%
    - f. Reverse Bend: ASTM D2794, no cracking or loss of adhesion
    - g. Nominal Thickness: ASTM D1005
      - 1) Primer: 0.2 mils
      - 2) Topcoat, 0.7 mils min
      - 3) Clear Coat (optional, only used with 22 ga. steel) 0.3 mils
    - h. Color: Provide as specified. (Subject to minimum quantities)
- F. 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

### **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. 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. Metal Deck: Metal deck shall be installed as specified in Section 05 31 00.
1. Fastening of the deck should comply with the anticipated live and dead loads pertaining to the building as well as applicable Code.
  2. Steel decks shall be minimum 22-gauge factory galvanized or zinc alloy coated for protection against corrosion.
  3. Suitable insulation shall be mechanically attached as recommended by the insulation manufacturer.
  4. Decks shall comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.
  5. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.

### 3.3 INSULATION BOARDS INSTALLATION

- A. Gypsum Vapor Barrier & 2 Base Layers: Attachment with Mechanical Fasteners
1. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation for FM I-90 system. Otherwise, a minimum of one fastener per two square feet shall be installed.
  2. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
  3. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the FM requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six (6) inches.
  4. Minimum penetration into deck shall be as recommended by the fastener manufacturer. There is a one (1) inch minimum for metal, wood and structural concrete decks where not specified by the manufacturer. For gypsum and cement-wood fiber decks, penetration shall be determined from pull-out test results with a minimum penetration of one and one-half (1 ½) inches.
  5. Gypsum and cementitious wood fiber decks: Where the roof deck is visible from the building interior, the contractor shall ensure no penetration of fasteners through underside of the deck. Any holes or spalling caused by fastener installation shall be repaired by the roofing contractor. Where the new roof system thickness exceeds an amount so that a minimum of 1 ½ of penetration cannot be achieved with an Olympic TB Fastener, or approved equivalent, then (and only then) toggle bolts may be used to secure installation to the deck.
  6. Tape joints of insulation as per manufacturer's requirements.
  7. Temporary roof: gypsum board:
    - a. 1 fastener in each corner per 4' x 4' board.
  8. 2 Layers of 2.2" polyisocyanurate insulation
    - a. Zone 1: 11 fasteners per 4' x 8' board
    - b. Zone 2 (upper roof): width 10'-10", 17 fasteners per board 4' x 8' board
    - c. Zone 2 (lower roof): width 9'-0", 17 fasteners per board per 4' x 8' board
    - d. Zone 3 (upper roof): width 3'-8", length 10'-10", 21 fasteners per board per 4' x 8' board
    - e. Zone 3 (lower roof): width 3'-0", length 9'-0", 21 fasteners per 4' x 8' board
- B. Tapered Layers and Cover Board: Attachment with Bitumen
1. Embed one layer of rigid insulation board in solid moppings of hot asphalt at the rate and

- temperature recommended by insulation manufacturer. Stagger end joints of boards so all open joints will be eliminated. Walk in each piece of insulation and leave boards completely adhered to deck. Each insulation board shall be butt firmly against adjoining panels. All open joints shall be eliminated.
2. Embed second layer of insulation board in solid moppings of hot asphalt after first layer has been attached as recommended by insulation manufacturer. Stagger end joints of boards so all open joints will be eliminated. Walk in each piece of insulation and leave boards completely adhered to base felt or deck. Each insulation board shall be butt firmly against adjoining panels. All open joints shall be eliminated.
  3. Approved insulation shall be tapered around roof drains and scuppers. Tapered insulation sump shall start with a thickness of one-half at drain bowl to the specified dimension of three feet from the center line of the drain. Install tapered insulation sump in such a way to provide proper slope for runoff. Shape insulation with tool as required so completed surface is smooth and flush with ring of drain. Under no circumstances will the membrane be left unsupported in an area greater than one quarter (1/4) inch. Install recovery board over tapered insulation sump as required.
  4. Approved recovery board one half (1/2) inch thickness shall be installed over base tapered insulation using hot asphalt at the rate of approximately thirty three (33) pounds per square.
  5. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (1/4) inch away from the vertical surface.
  6. Install no more insulation at one time than can be roofed on the same day.
  7. Install temporary water cut-offs at completion of each day's work and remove upon resumption of work.
  8. Can't Strips/Tapered Edge Strips: Install preformed forty-five (45) degree cant strip at junctures of vertical surfaces. Provide preformed, tapered edge strips at perimeter of edges of roof that do not terminate at vertical surfaces and/or indicated on the drawings.

### 3.4 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.

### 3.5 INSTALLATION HOT APPLIED ROOF SYSTEM

- A. Base Ply: Install base sheet or felt plies in twenty-five (25) lbs per square of bitumen shingled uniformly to achieve one or more plies over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof. Do not step on base rolls until asphalt has cooled, fish mouths should be cut and patched.
  1. Lap ply sheet ends 8 inches. Stagger end laps 2 inches minimum.
  2. Install base flashing ply to all perimeter and projection details after membrane application.

3. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
  4. Install base flashing ply to all perimeter and projection details.
  5. 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): Solidly bond the modified membrane to the base layers with specified material at the rate of 25 to thirty 30 lbs. per 100 square feet.
1. Roll must push a puddle of hot material in front of it with material slightly visible at all side laps. Use care to eliminate air entrapment under the membrane. Exercise care during application to eliminate air entrapment under the membrane.
  2. Apply pressure to all seams to ensure that the laps are solidly bonded to substrate.
  3. Install subsequent rolls of modified membrane as above with a minimum of 4 inch side laps and 8 inch end laps. Stagger end laps. Apply membrane in the same direction as the previous layers but stagger the laps so they do not coincide with the laps of the base layers.
  4. Apply hot material no more than 5 feet ahead of each roll being embedded.
  5. Extend membrane 2 inches beyond top edge of all cants in full moppings of the specified hot material.
- 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 07 62 00. 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 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 surfaces 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 hot material unless otherwise noted in these specifications. Nail off at a minimum of 8 inches o.c. from the finished roof at all vertical surfaces.
  4. Solidly adhere the entire sheet of flashing membrane to the substrate.
  5. Seal all vertical laps of flashing membrane with a three-course application of trowel-grade mastic and 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.

H. Flood Coat/Aggregate:

1. Install after cap sheets and modified flashing, tests, repairs and corrective actions have been completed and approved.
2. Apply flood coat materials in the quantities recommended by the manufacturer.
3. Uniformly embed aggregate in the flood coat of cold adhesive at a rate recommended by the manufacturer.
4. Aggregate must be dry and placed in a manner required to form a compact, embedded overlay. To aid in embedment, lightly roll aggregate.

I. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the 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 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.

J. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.

### 3.6 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. Roof Drain:

1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 24 inches from center of drain.
3. Install two base flashing plies (40 inch square minimum) in bitumen.
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. Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
5. Run roof system plies over drain. Cut out plies inside drain bowl.
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.

B. 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 onto field of roof.
4. Install second layer of modified membrane extending 9 inches 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.
- C. Pre-Manufactured Flash-less Snap-On Metal Edge System:
1. Position base ply of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and thermoplastic cap ply with proper material and procedure according to manufacturer's recommendations. Thermoplastic cap ply shall stop at the edge of the roof and shall not turn over the edge of the nailer.
  2. Prior to installing the base anchor, assure a level plane is present. If not, shim the roof edge surface as required.
  3. Extruded base anchor: Apply two 1/4" beads of Green-Lock Sealant XL or equal on the bottom surface of the top flange of the extruded anchor.
  4. Set the extruded anchor on the edge and face fasten through pre-punched slots every 18 inches o.c. for 5.75 inch face fascia, and 18 inches o.c. staggered for any fascia size greater than 5.75 inches. Begin fastening 6 inches from ends.
  5. Install Green-Lock Sealant XL or equal at the ends of the base frame to prevent water from running between base anchor joints.
  6. Install compression seals every 40 inches on center in the slots located at the top of the extruded anchor.
  7. Install fascia cover setting the top flange over the top flange and compression seals of the base anchor. Assure compression seals are in place during this process. Beginning on one end and working towards the opposite end, press downward firmly (do not rotate) until "snap" occurs and cover is engaged along entire length of miter.
  8. Install splice plate at each end of the base anchor and fascia cover prior to the installation of the next adjacent ten foot piece.
- D. Pre-manufactured Snap-On Coping Cap:
1. Install miters first.
  2. Position base flashing ply over the wall edge covering nailers completely, fastening 8 inches on center. Install base ply and thermoplastic cap ply with proper material and procedure according to manufacturer's recommendations.
  3. Install minimum 16 gauge, 16 inch long by specified width anchor chair at [Contact Garland Representative] feet on center.
  4. Install 6-inch wide splice plate by centering over 16 inch long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center. Approximately 2 inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.
- E. Surface Mounted Counterflashing:
1. Minimum flashing height is 8 inches above finished roof height. Maximum flashing height is 24 inches. Prime vertical wall and allow to dry.
  2. Set cant in bitumen. Run all base field plies over cant a minimum of 2 inches.
  3. Install base flashing ply covering wall set in bitumen with 6 inches onto 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 onto the field of the roof.
  6. 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.
  7. Secure counterflashing set on butyl tape above flashing at 8 inches o.c. and caulk top of counterflashing.
- F. Equipment Support:

1. Minimum curb height is 8 inches 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.
  3. Install base flashing ply covering the curb set in bitumen with 6 inches 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 to the field of the roof.
  6. Install pre-manufactured cover. Fasten sides at 24 inches o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
  7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- G. Curb Detail/Air Handling Station:
1. Minimum curb height is 8 inches 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.
  3. Install base flashing ply covering the curb set in bitumen with 6 inches onto 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 onto the field of the roof.
  6. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
  7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- H. Pre-manufactured Curb for Equipment Support:
1. Minimum curb height is 8 inches above finished roof height. Prime vertical and allow to dry.
  2. Run all base field plies over the pre-manufactured cant a minimum of 2 inches.
  3. Install base flashing ply covering the pre-manufactured curb set in bitumen with 6 inches 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 onto the field of the roof.
  6. Install pre-manufactured cover. Fasten sides at 24 inches o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
  7. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- I. Exhaust Fan:
1. Minimum curb height is 8 inches 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.
  3. Install base flashing ply covering wall set in bitumen with 6 inches 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 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.
- J. Passive Vent/Air Intake:
1. Minimum curb height is 8 inches 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.
  3. Install base flashing ply covering wall set in bitumen with 6 inches onto 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 onto the field of the roof.
6. Install passive vent/air intake over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendations.

K. Roof Drain:

1. Plug drain to prevent debris from entering plumbing.
2. Taper insulation to drain minimum of 24 inches from center of drain.
3. Run roof system base 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. Prime lead/copper and allow to dry.
5. Install base flashing ply (40 inch square minimum) in bitumen.
6. Install thermoplastic cap ply (48 inch square minimum) in bitumen or foam adhesive.
7. Install clamping ring and assure that all plies are under the clamping ring.
8. Remove drain plug and install strainer.

L. Plumbing Stack:

1. Minimum stack height is 12 inches.
2. Run roof base ply over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install thermoplastic cap ply in bitumen or foam adhesive.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Turn sleeve a minimum of 1 inch down inside of stack.

M. Heat Stack:

1. Minimum stack height is 12 inches.
2. Run roof base ply over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch bed of roof cement.
4. Install base flashing ply in bitumen.
5. Install thermoplastic cap ply in bitumen or foam adhesive.
6. Caulk the intersection of the membrane with elastomeric sealant.
7. Install new collar over cape. Weld collar or install stainless steel draw band.

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 thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch recover board is required on new roofing.

CUYAHOGA COUNTY  
VETERANS SERVICE COMMISSION  
HEADQUARTERS RELOCATION

- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

**END OF SECTION 07 52 00**

ADDENDUM, NO. 1