SECTION 075500 - MODIFIED BITUMINOUS MEMBRANE ROOFING - TORCH APPLIED

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY -

A. Torch applied asphalt modified bituminous membrane roofing over prepared substrate and insulation system.

1. Remove existing roof system down to the metal roof decks.
2. Install specified roof insulation system and recovery board in accordance with Division 7 Section “Roof Insulation”.
3. Install one (1) ply of the specified self adhered modified bitumen base sheet over all exposed wood surfaces prior to the installation of torch applied membranes
4. Install the specified SBS modified base roofing ply throughout the field via the specified torch methods.
5. Install one (1) ply of the specified SBS modified mineral surfaced cap sheet over the base roofing ply via the specified torch methods
6. Install two (2) ply modified asphalt membrane flashing system in the specified torch applied flashing adhesive where applicable.
7. Apply specified aluminum coating over field and flashings (All Roof Areas U.N.O.).

B. This portion of the specification sets forth the general requirements and describes materials and workmanship for installing the torch applied modified bituminous membrane roof system over prepared substrates.

1.3 RELATED SECTIONS

A. Division 7 Section “Roof Insulation” for insulation above the roof deck.
B. Division 7 Section “Modified Bituminous Membrane Re-Roofing Procedures”.
C. Division 7 Section “Sheet Metal Flashing and Trim”.

1.4 REFERENCES

A. American Society of Civil Engineers (ASCE):
1. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures.

B. American Society for Testing and Materials (ASTM):
1. ASTM D41, Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.

2. ASTM D312, Specification for Asphalt Used in Roofing.
3. ASTM D451, Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
4. ASTM D1079, Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
5. ASTM D1863, Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
6. ASTM D2178, Specification for Asphalt Glass Felt Used as a Protective Coating for Roofing.
7. ASTM D2822, Specification for Asphalt Roof Cement.
8. ASTM D2824, Specification for Aluminum-Pigmented Asphalt Roof Coating.
9. ASTM D4601, Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
10. ASTM D5147, Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
11. ASTM D6162, Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
12. ASTM D6163, Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
13. ASTM E108, Test Methods for Fire Test of Roof Coverings.

C. Factory Mutual Research (FM):
   1. Roof Assembly Classifications.

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

E. Underwriters Laboratories, Inc. (UL):
   1. Fire Hazard Classifications.

F. Warnock Hersey (WH):
   1. Fire Hazard Classifications.

1.5 SYSTEM DESCRIPTION

A. It is the intent of this specification to install a long-term, quality roof system that meets or exceeds all current NRCA guidelines as stated in the most recent edition of the NRCA Roofing and Waterproofing Manual. Please discuss any concerns with the Engineer and Roofing System Manufacturer.

1.6 DISCLOSURE OF MATERIALS

A. The materials outlined herein are the materials that are to be used in this project. When a particular make or trade name is specified, it shall be indicative of the minimal standard of material required and to be used.

   i. The Architect reserves the right to be the final authority on the acceptance or rejection of any or all bids, or materials that has not met all specified requirement criteria.

1.7 SUBMITTALS

A. Submit under provisions of Contract Documents, Division 1 and this section.

B. Product Data: Provide manufacturer's technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.

C. Samples: Submit two (2) samples of each product specified.

D. Manufacturer's Installation Instructions: Submit installation instructions and recommendations indicating special precautions required for installing the membrane.

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

F. Manufacturer's Wind Uplift Certificate: The manufacturer of the modified bitumen membrane must provide certification that the proposed roof system will be secured properly to the structure to meet or exceed the specific project wind uplift requirements per Section 1.16 Design and Performance Criteria.

G. Manufacturer's Manufacturing Certificate: Certify that modified membrane materials to be used on this project 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. Manufacturer's Manufacturing Certificate: Submit a certified copy of the roofing manufacturer's ISO 9001:2008 compliance certificate.

I. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77°F. Tests at 0°F will not be considered.

J. Submit a copy of an unexecuted manufacturer's warranty for review.

K. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.

L. Provide a sample of each insulation type.

M. Shop Drawings:
   1. Submit four (4) copies of manufacturer's shop drawings indicating complete installation details of tapered and flat insulation system, including identification of each insulation

block, sequence of installation, layout, drain locations, sumps, roof slopes, thicknesses, tapered crickets and saddles.

2. Shop drawing shall include: Outline of roof, location of drains, sumps, complete board layout of tapered insulation components, thickness and the minimum and average "R" value for the completed insulation system.

N. **Design Loads: Submit copy of manufacturer's minimum design load calculations according to ASCE 7-16, Method 2 for Components and Cladding, prepared by an engineer employed by the system manufacturer. In no case shall the design loads be taken to be less than those detailed in article 1.16 of this specification.**

1.8 QUALITY ASSURANCE & QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 15 years documented experience and having ISO 9001:2008 certification.

B. Manufacturer: The manufacturer must also have current ISO 9001:2008 certification for the manufacturing of the products to be utilized on this project.

C. Installer: Company specializing in modified bituminous roofing installation with a minimum 5 years experience and certified by roofing system manufacturer as qualified to install manufacturer's roofing materials.

D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work and at any time roofing work is in progress. Maintain proper supervision of workmen. Maintain a copy of the specifications in the possession of the Supervisor/Foremen and on the roof at all times.

1. Maintain a copy of the Contract Documents in the possession of the Supervisor/Foreman and on the roof at all times.

E. 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.

1. 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.

F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner has the right to hire a qualified contractor and backcharge the original contractor.

G. Insurance Certification: 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.

1.9 PRE-INSTALLATION CONFERENCE

A. Pre-Installation Roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of modified bituminous roofing system installation and associated work**.**

B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner's insurers, testing agencies and governing authorities.

C. Objectives of conference to include:
   1. Review foreseeable methods and procedures related to roofing work.
   2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
   3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
   4. Review roofing system requirements (drawings, specifications and other contract documents).
   5. Review required submittals both completed and yet to be completed.
   6. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
   7. Review required inspection, testing, certifying and material usage accounting procedures.
   8. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).
   9. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
   10. Review notification procedures for weather or non-working days.

D. The Owner's Representative will designate one of the conference participants to record the proceedings and promptly distribute them to the participants for record.

E. The intent of the conference is to resolve issues affecting the installation and performance of roofing work. Do not proceed with roofing work until such issues are resolved the satisfaction of the Owner and Engineer of Record. This shall not be construed as interference with the progress of Work on the part of the Owner or Engineer of Record.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover the roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. In accordance with the manufacturer's recommendations, immediately remove the plastic wrapping on the roof recovery boards and cover with a watertight, ventilated enclosure (i.e. tarpaulins). Prevent the formation of condensation on the boards.

D. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

E. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

F. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).

1.11 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer **must** provide the following:
   1. Keep the Architect/Owner informed as to the progress and quality of the work as observed.
   2. Provide job site inspections a **minimum of three (3) days a week** with weekly reports to the Architect/Owner.
   3. Report to the Architect/Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractors attention.
   4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

B. At the request of the Owner, the roofing system manufacturer shall provide the Owner, or his representative, **with an annual inspection of the roofing system.** This period shall be for the duration of the delivered warranty period.

1.12 PROJECT CONDITIONS

A. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.

B. Do not apply roofing insulation or membrane to damp deck surface.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.13 SEQUENCING AND SCHEDULING

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

B. Fully complete the installation of insulation system and base roofing ply assembly, and/or the installation of the modified bituminous membrane roof ply each day. Phase construction between the base roofing ply and modified membrane roof ply (top ply) is acceptable.

1.14 WARRANTY

A. Upon completion of installation, and acceptance by the Architect, the manufacturer will supply to the **Owner a single-source, thirty (30) year Edge-to-Edge no dollar limit (NDL) warranty.** This Edge-to-Edge warranty shall cover the roof system and flashings, coating, roof flood coat and gravel and the pre-fabricated metal edge fascia system. Warranty will include the roof systems, modified bitumen flashings, pre-manufactured metal edge fascia system and the transition between all systems.

B. Installer will submit a minimum of a three (3) year warranty to the manufacturer with a copy directly to Owner.

C. At the request of the Owner, the roofing system manufacturer shall provide the Owner, or his representative, with an annual inspection of the roofing system. This period shall be for the duration of the delivered warranty period.

1.15 SITE CONDITIONS

A. Field measurements and material quantities:

1. Contractor shall have SOLE responsibility for accuracy of all measurements, estimates of material quantities and sizes, and site conditions that will affect work.

B. Existing Conditions:

1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner operations unless prior written approval is received from Owner.

C. Waste Disposal:

1. Do not re-use, re-cycle or dispose of materials except in accordance with all applicable regulations. The use of products is responsible for proper use and disposal of product containers.

D. Safety Requirements:

1. All application, material handling, and associated equipment shall conform to and be operated in conformance with OSHA safety requirements.
2. Comply with federal, state, local and Owner fire and safety requirements.
3. Advise Owner whenever work is expected to be hazardous to Owner, employees, and/or operators.
4. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
5. Maintain fire extinguisher within easy access whenever power tools, roofing kettles, fuels, solvents, torches and open flames are being used.

1.16 DESIGN AND PERFORMANCE CRITERIA

A. 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 7-16, Method 2 for Components and Cladding.

b. Category III Building with an Importance Factor of 1.0.

c. Wind Speed: 124 mph

d. Exposure Category: C

e. Design Roof Height: 24 feet

f. Minimum Building Width: 103 feet

g. Roof Pitch: 1/4 inches per foot (tapered insulation)

i. Topographic Factor: 1.00

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, (908) 812-6971 and shall form the basis of design for these contract documents.

B. Provide primary products, including each type of roofing membrane, base flashings, flashing membrane ply, miscellaneous flashing materials and surfacing's from a single source roof

manufacturer. Provide secondary products (insulation, recovery board, etc.) only as recommended by the roof manufacturer of primary products for use with the roof system specified.

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 Architect 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 Architect find the substitution unacceptable.

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

a. The Garland Company, Inc.
b. Approved Equal

2.2 DESCRIPTION

A. Modified bituminous roofing work including but not limited to:

1. Prior to installing the insulation system on the roof deck, repair or replace any defects in accordance with the project specifications.

2. Installation of polyisocyanurate insulation and recovery board over the properly prepared roof deck in accordance with Division 7 Roof Insulation Section.

3. Self-Adhered Base Flashing Ply: SA BASE IV or approved equal; One (1) ply of 110 mil thick SBS fiberglass reinforced, self-adhering modified base sheet fully adhered to any **exposed wood surfaces that need to be waterproofed.**

4. Base Roofing Ply: HPR TORCH BASE SHEET or approved equal; One (1) ply of 110 mil thick SBS Torch Grade Base Sheet fully adhered to approved torchable insulation with roofer's torches.

5. Base Flashing Ply: HPR TORCH BASE SHEET or approved equal; One (1) ply of 110 mil thick SBS Torch Grade Base Sheet fully adhered to approved torchable insulation with roofer's torches.

6. Modified Membrane Roofing Ply: STRESSPLY IV PLUS MINERAL **(All Roof Areas U.N.O.);** One (1) ply of 195 mil thick SBS (Styrene-Butadiene-Styrene) mineral surfaced rubber modified roofing membrane with a dual polyester/fiberglass scrim. This membrane is designed for torch applications and has a burn-off backer that indicates when the material is hot enough to be installed.

7. Modified Membrane Flashing Ply: STRESSPLY IV PLUS MINERAL; One (1) ply of 195 mil thick SBS (Styrene-Butadiene-Styrene) mineral surfaced rubber modified

roofing membrane with a fiberglass scrim. This membrane is designed for torch applications and has a burn-off backer that indicates when the material is hot enough to be installed.

8. Surfacing: GARLA-BRITE or approved equal; A non- fibered, asphalt-based aluminum roof coating system **(All Roof Areas U.N.O**.).

2.3 BITUMINOUS MATERIALS

A. Asphalt Primer: V.O.C. compliant, ASTM D-41.

B. Asphalt Roofing Mastic: V.O.C. compliant, ASTM D-2822, Type II.

C. Flashing Adhesive: FLASHING BOND or approved equal, cold applied flashing adhesive.

D. Aluminized Asphalt Roofing Mastic: SILVER-FLASH or approved equal.

E. Elastomeric Asphaltic Sealant: GARLA-FLEX SEALANT or approved equal.

F. Penetration Sealant: TUFF-FLASH PLUS LO LIQUID FLASHING ADHESIVE

2.4 SHEET MATERIALS

A. Base Roofing Ply: SA BASE IV or approved equal **(For exposed wood surfaces only)**
1. SA BASE IV: 110 mil SBS fiberglass reinforced self-adhering modified base sheet with the following minimum performance requirements according to ASTM D-5147.

Properties (Finished Membrane):		
Tensile Strength (ASTM D-5147) 2 in/min. @73.4 ± 3.6°F	MD 75 lbf/in	XD 50 lbf/in
Tear Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 105 lbf	XD 100 lbf
Elongation at Maximum Tensile (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 5.0%	XD 5.0%
Low Temperature Flex (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	0°F	
Thickness :	100 mils	

B. Base Roofing Ply: HPR TORCH BASE SHEET or approved equal
1. HPR TORCH BASE SHEET: 110 mil SBS Torch Grade Base Sheet with woven fiberglass scrim reinforcement with the following minimum performance requirements according to ASTM D-5147.

Properties: (Finished Membrane):

Tensile Strength (ASTM D-5147) 2 in/min. @73.4 ± 3.6°F	MD 210 lbf/in	CMD 210 lbf/in
Tear Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 250 lbf	CMD 250 lbf
Elongation at Maximum Tensile (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 4.0%	CMD 4.0%
Thickness :	110 mils	
Post-Consumer Recycled Content :	6%	

C. Base Flashing Ply: HPR TORCH BASE SHEET or approved equal
   1. HPR TORCH BASE SHEET: 110 mil SBS Torch Grade Base Sheet with woven fiberglass scrim reinforcement with the following minimum performance requirements according to ASTM D-5147.

Properties: (Finished Membrane): Tensile Strength (ASTM D-5147) 2 in/min. @73.4 ± 3.6°F	MD 210 lbf/in	CMD 210 lbf/in
Tear Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 250 lbf	CMD 250 lbf
Elongation at Maximum Tensile (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 4.0%	CMD 4.0%
Thickness :	110 mils	
Post-Consumer Recycled Content :	6%	

D. Modified Membrane Flashing Ply: STRESSPLY IV PLUS MINERAL or approved equal
   1. STRESSPLY IV PLUS MINERAL: 195 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced rubber modified roofing membrane with a dual polyester/fiberglass scrim. This membrane is designed for torch applications and has a burn-off backer that indicates when the material is hot enough to be installed. The membrane has the following minimum performance characteristics according to ASTM D 6162 Type III Grade G

Tensile Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 310 lbf/in	XD 310 lbf/in
Tear Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 510 lbf	XD 510 lbf
Elongation at Maximum Tensile (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 9.0%	XD 8.0%

Low Temperature Flexibility (ASTM D-5147)	Passes -40°F (-40°C)
Thickness :	195 mils

E. Modified Membrane Roofing Ply **(All Roof Areas U.N.O.):** STRESSPLY IV PLUS MINERAL or approved equal
   1. STRESSPLY IV PLUS MINERAL: 195 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced rubber modified roofing membrane with a dual polyester/fiberglass scrim. This membrane is designed for torch applications and has a burn-off backer that indicates when the material is hot enough to be installed. The membrane has the following minimum performance characteristics according to ASTM D 6162 Type III Grade G

Tensile Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 310 lbf/in	XD 310 lbf/in
Tear Strength (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 510 lbf	XD 510 lbf
Elongation at Maximum Tensile (ASTM D-5147) 2 in/min. @ 73.4 ± 3.6°F	MD 9.0%	XD 8.0%
Low Temperature Flexibility (ASTM D-5147)		Passes -40°F (-40°C)
Thickness :		195 mils

F. Reinforcing Mesh for Flashing Seams – GARMESH or approved equal; Styrene-Butadiene-Rubber (SBR) coated, woven, fiberglass scrim.

G. Reinforcing Mesh for Fluid Applied Membranes – GRIP POLYESTER SOFT or approved equal;

2.5 SURFACINGS

A. Mineral Surfaced Membrane: Roofing Granules shall meet requirements of ASTM D-451 and/or be recommended by the membrane manufacturer. Loose granules for bleedout shall match size and color of granulated membrane sheet.

B. Mineral Surfaced Membrane: If minerals are not applied properly into the bleedout, apply manufacturers' PYRAMIC BASE COAT or approved equal on field seams of modified bitumen roofing ply and broadcast minerals into the coating while it is still wet. Roofing Granules shall meet requirements of ASTM D-451 and/or be recommended by the membrane manufacturer.

C. SILVER-FLASH or approved equal: Aluminized asphalt mastic for the three-course application on vertical flashing seams.

D. Roof & Flashing Coating (All Roof Areas U.N.O.): GARLA-BRITE or approved equal; ASTM D2824 Type I non-fibered aluminum coating. **Installation of the minerals in the bleedout are still required for the coating application.**

2.6 RELATED MATERIALS

A. Roof Insulation and Recovery Boards: In accordance with Division 7 Roof Insulation Section.

B. Roof Insulation Fasteners: In accordance with Division 7 Sections 07 22 00 & 07 22 10

C. Roof Insulation and Recovery Board Adhesive: In accordance with Division 7 Roof Insulation Sections.

D. Nails and Fasteners: Non-ferrous metal or hot dipped galvanized fasteners complying with ASTM A153 and connectors complying with ASTM A653, Class G185; Type 304 or Type 316 stainless steel fasteners and connectors shall be used with new generation of pressure-treated wood; 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 manufacturer of the wood blocking/nailer material. Nails and fasteners shall be flush-driven through flat metal discs of not less than one (1) inch diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than one (1) inch diameter are used.

E. Metal Discs: Flat discs or caps of zinc-coated sheet metal not lighter than twenty eight (28) gauge and not less than one (1) inch in diameter. Form discs to prevent dishing. Bell or cup shaped caps are not acceptable.

F. Metal Flashing Sheet: Metal flashing sheet is specified in Section 07 60 00 - Sheet Metal Flashing and Trim.

G. Lead Flashing Sheet: Meets Federal Specification QQ-L-201, Grade B, four pounds per square foot.

H. Metal Termination Bars:

1. Shall be heavy flat bar aluminum unless otherwise recommended by membrane manufacturers.

2. Material shall be .125” x 1” (minimum) aluminum conforming to ASTM B-221, mill finish.

I. Protection and Walkway Pads: Recycled rubber (97% recycled rubber), anti-skid surface pads, manufactured as a traffic pad for foot traffic and acceptable to roofing system manufacturer, ½ inch thick, minimum.

1. Minimum Pad Size: 3’-0” x 3’-0”

J. Protection and Walkway Pads Adhesive: GREENLOCK STRUCTURAL SEALANT.

K. Urethane Sealant: One part, non-sag sealant as recommended by the membrane manufacturer for moving joints.

1. Tensile Strength (ASTM D412)	250 psi
2. Ultimate Elongation (ASM D412)	950%
3. Hardness, Shore A (ASTM C920)	35
4. Adhesion-in-Peel (ASTM C920)	25 pli
5. 100% Modulus (ASTM D412)	50 psi
6. Bond (Durability-Class 25, ASTM C920)	Passes
7. Service Temperature Range	-40°F to +180°F
8. Stain and Color Change (ASTM C920)	Passes
9. Tack Free Time (ASTM C679 (max 72 hrs.)	16 hrs.
10. Weep and Sag (ASTM C920 (max 3/16"(4mm)))	Passes
11. Weight loss after heat aging (ASTM C920 (max 10%))	Passes

L. Pitch Pocket Sealer: Seal-Tite or approved equal; one-part, pourable, self-leveling, 100% solids, urethane sealant.

M. Non-Shrink Grout: Use an 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)

N. Primer: SA Primer or approved equal; polymer emulsion-based primer designed to improve the adhesion of self-adhered membranes (**to be used prior to torch application where exposed wood blocking is found).**

O. Reinforced Liquid Flashing: TUFF-FLASH PLUS LO or approved equal, two (2) part multi-purpose, asphaltic polyurethane based, low-odor, liquid flashing membrane system reinforced with an approved reinforcing scrim as provided by the roof membrane manufacturer.

1. Tensile Strength, ASTM D 412: 650 psi
2. Tear Strength, ASTM D624: 115 lbf/in
3. Elongation, ASTM D 412: 325%
4. Hardness, Shore A ASTM D2240@77°F: 55
5. Density @77 deg. F 8.3 lb/gal typical

P. Bellows Expansion Joint System: METALASTIC or approved equal curb to curb, wall to curb assembly, and Straight Metal Flange (SMF) system as per the project details, documents and manufacturer's recommendations.

Q. Existing Drains: All existing drains shall be replaced. New drains shall be J.R. Smith, or equal, and match existing drain sizes and configuration. New drain assemblies shall include new drain bowls, deck clamps, clamping ring, hardware and cast-iron strainer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate surfaces to receive modified bituminous membrane roof system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to the manufacturer.

B. Prior to installing the finish modified membrane roofing ply, the contractor must notify the roof system manufacturer representative, and Owner's representative, to examine the roof area for high and low spots. It may be necessary to mist the roof with water to identify the problem areas. The contractor will correct all problem areas identified. This examination should take place no less than 24 hours in advance of installing the finished membrane.

C. Verify that deck surfaces and project conditions are ready to receive work of this section.

D. Verify that deck is supported and secured to structural members.

E. Verify that deck is clean and smooth, free of depressions, projections or ripples, and is properly sloped to drains or level as shown in the project documents. Clean roof deck of dirt, debris, water and snow.

F. Verify that adjacent roof members do not vary more than 1/4 inch in height.

G. Verify that deck surfaces are dry, free of snow or ice, not deteriorated, do not have bacterial growth, and are structurally sound.

H. Confirm that moisture content within the wood blocking and nailers does not exceed twelve (12) percent by moisture meter tests.

I. Verify that openings, curbs, pipes, conduit, sleeves, ducts, and other items which penetrate the roof are set solidly, and that wood cant strips, wood nailing strips and reglets are set in place. Verify that all roof curb heights are satisfactory and that the wood blocking height along the perimeter of the building and/or roof levels is satisfactory to provide positive roof pitch away from the building edge.

J. Contractor is responsible to verify existing substrate and structure is sloped as stated in/on the project documents prior to installation of insulation system. All defects in roof pitch to be accommodated with tapered insulation to insure a positive pitch to all roof drains.

3.2 PREPARATION - REMOVAL

A. Remove existing roof system(s), counter-flashings, roof flashings, and all accessories back to the roof deck and masonry walls.

B. Remove all existing scupper assemblies and install new scupper assemblies. New scuppers shall be in accordance with the above specification.

1. Prior to beginning work, contractor shall verify/test that existing roof drains are in working, or non-working, order. If the drains are in non-working order, the Owner shall address the non-working drain to working conditions. If the drains are in working order, then the contractor will be required to maintain, and deliver, the drains back to the Owner in working order.

C. Clean substrate of debris and other substances detrimental to roofing installation according to the roof system manufacturer's written instructions. Remove sharp objects.

D. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Use roof drain plugs as required to prevent materials from entering and clogging roof drains and conductors. Remove roof drain plugs at the end of each work day or when rain is forecasted. Replace or restore other work damaged by installation of the modified bituminous roofing system.

E. All existing roofing shall be torn off and removed completely down to the roof structure decking. Remove all Lightweight Concrete down to structural concrete deck **(School #9).** Dispose off-site in dumpsters.

F. Tear off only enough roofing, which can be successfully reroofed, in a single day.

G. Fully complete the installation of insulation system and base roofing ply assembly, and/or the installation of the modified bituminous membrane roof ply each day. Phase construction between the base roofing ply and modified membrane roof ply (top ply) is acceptable.

3.3 PREPARATION – METAL DECK

A. Clean substrate of debris and other substances detrimental to roofing installation according to the roof system manufacturer's written instructions. Remove sharp objects.

B. If bad corroded, deteriorated, damaged or unsound decking is present, it shall be removed and replaced using the same materials as the original, unless otherwise specified.

C. As required, install preformed sound absorbing insulation strips in acoustic deck flutes in accordance with manufacturer's instructions.

3.4 DRAIN INSTALLATION

A. Existing Drains: All existing drains will be replaced. New drains shall be in accordance with project documents and specified above. Sizes shall match existing. Drains will have new deck clamps, threaded receivers, and cast iron metal strainers. On roof sections having a gravel surfacing, a perforated stainless steel gravel guard that is integral with the clamping ring shall be installed. **Drains shall be installed prior to the roof installation at the proper height above the roof deck, and in accordance with the project documents.**

3.5 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.

B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

C. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the modified bituminous roofing system.

D. Coordinate installation of roofing system components so that the insulation is not exposed to precipitation or left exposed overnight. Provide cut-offs at end of each day's work to cover exposed ply sheets and insulation with two (2) plies of #15 organic roofing felt with joints and edges sealed with roofing cement and other jointly agreed upon tie-in detail. Remove cut-offs immediately before resuming work.

E. Substrate Joint Penetrations: Prevent bitumen from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Apply roofing materials as specified by manufacturer's instructions.
   1. Keep roofing materials dry before and during application.
   2. Begin and apply only as much roofing in one day as can be completed that same day.

G. Cut-Offs/Envelope Waterstops: At end of each day's roofing installation, protect exposed edge of incomplete work, including ply sheets and insulation. Install waterstop/temporary flashing a minimum of 6 inches under face edge of insulation and wrapped up face and back a minimum of 6 inches from the face in asphalt mastic at ¾ pounds per foot, top dress waterstop with asphalt mastic.

H. All wood blocking and/or sheathing where noted is to be primed with SA primer at a rate of .5 gallons per square and allowed to dry. All wood is to be covered with SA membrane extending beyond the wood edges a minimum of 2" in all direction.

I. A minimum two-hour fire watch is required for each day that torch-applied membranes are Installed unless noted otherwise by Owner. Keep an approved rated fire extinguisher every 3,000 square feet maximum on the roof. The fire extinguisher shall be placed in a central location in that area where all workers know where it is and how to operate in properly.

3.6 INSULATION INSTALLATION

A. Refer to Roof Insulation specification Division 7 Section 07 22 00 for complete installation requirements.

B. Deck type: Metal.

C. Insulation: Tapered and Flat, rigid polyisocyanurate insulation with a minimum total thickness as specified, and a high density, fiber-reinforced recovery board.

D. Insulation Attachment (Metal Decks): Polyisocyanurate insulation and the recovery board shall be installed over the properly prepared metal deck with the specified mechanical fasteners in accordance with wind uplift calculations and manufacturer's recommendations.

E. Joints of Recovery Board: Before installing the torch-applied modified bitumen roof system over the recovery board, ALL joints of the recovery board must be sealed with a 3-course application of mesh and cold-applied, solvent free adhesive or specified roof board joint tape.

3.7 BASE ROOFING PLY INSTALLATION:

A. Install the specified Base Roofing Ply to the properly prepared substrate. Shingle in proper direction to shed water on each area of roofing.

B. To an approved recovery board, lay out the roll in the course to be followed and unroll six (6) feet.

C. 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.

D. After the major portion of the roll is bonded, re-roll the first six (6) feet and bond it in a similar fashion.

E. Repeat this operation with subsequent rolls with side laps of four (4) inches and end laps of eight (8) inches.

F. 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.

G. Extend underlayment two (2) inches beyond top edges of cants at wall and projection bases.

H. Install base flashing ply to all perimeter and projection details.

I. Keep an approved rated fire extinguisher every 3,000 square feet maximum on the roof. The fire extinguisher shall be placed in a central location in that area where all workers know where it is and how to operate in properly.

3.8 MODIFIED MEMBRANE ROOFING PLY APPLICATION:

A. Install specified Modified Membrane Roofing Ply as described below.

B. Over the specified Base Roofing Ply, lay out the roll in the course to be followed and unroll six (6) feet. Seams for the top layer of modified membrane will be staggered over the Base Roofing Ply sheet seams. End laps of the specified Modified Membrane Roofing Ply shall be

staggered 12 inches minimum with the Base Roofing Ply end laps.

C. 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.

D. After the major portion of the roll is bonded, re-roll the first six (6) feet and bond it in a similar fashion.

E. Repeat this operation with subsequent rolls with side laps of four (4) inches and end laps of eight (8) inches. End laps of the specified Modified Membrane Roofing Ply shall be staggered 12 inches minimum.

F. 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. Ensure a uniform and complete bleed out from the side and end laps. Embed minerals into the bleed out while melted and liquid.

G. Install modified flashing ply to all perimeter and projection details.

H. Keep an approved rated fire extinguisher every 3,000 square feet maximum on the roof. The fire extinguisher shall be placed in a central location in that area where all workers know where it is and how to operate in properly.

3.9 FLASHING MEMBRANE INSTALLATION

A. 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.

B. Prepare all drain leads, walls and edge details to be flashed and where shown on the drawings, with asphalt primer at the rate of .75 to one gallon per square. Allow primer to dry tack free.

C. All wood blocking must be covered with manufacture's self-adhering modified membrane prior to the installation of any torch applied materials.

D. The wall/cant juncture will be examined for air passage. If airflow is present, the joint between the cant and wall will be sealed with a closed cell joint backing and reglet joint sealant.

E. Use the specified modified roof membrane flashing ply as the top flashing ply membrane and adhere to the underlying base flashing ply. Unless noted otherwise, secure at a minimum of twelve (12) inches from the finished roof surface using a continuous termination bar fastened at a maximum of six (6) inches on center.

F. Seal all vertical laps of flashing membrane with a three-course application of Silver-Flash aluminized trowel-grade mastic and mesh.

G. Coordinate counter flashing, cap flashings, expansion joints, and similar work with modified bitumen roofing work as specified in other sections.

H. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work as specified in other sections.

I. Flash all penetrations as specified below and per the project documents. If specific detail is not shown in drawings or specified below, flash detail in accordance with the manufacturer's specifications to comply with the specified guaranty.

J. 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 ¼ 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) via torch methods.
5. Install modified membrane (forty-eight (48) inch square minimum) via torch methods. 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 clamping ring over lead flashing.
7. Remove drain plug and install strainer.

K. Pre-Manufactured Snap on Metal Edge Fascia System:
1. Inspect the nailer to assure proper attachment and configuration prior to installing the roof system. Install new wood nailers as required and/or specified to achieve the proper height of the insulation plus roof recovery board. Wood nailers shall be set for highest thickness of insulation and roof recovery board, and shall be maintained constant around the perimeter of the roof.
2. Install tapered edge, and or cant strip, in adhesive to create a smooth transition from roof system to wood blocking.
3. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at eight (8) inches o.c.
4. Install new metal fascia/extender system with continuous cleat. Fasten to the wall and/or wood blocking at 6” o.c. each item.
5. Install new pre-fabricated metal cant dam system in a bed of roof cement, and fasten at twelve (12) inches on center both top flange and outside face of cant dam with specified fasteners.
6. Prime cant dam at a rate of one hundred (100) square feet per gallon and allow to dry.
7. Strip in flange with base flashing ply covering entire cant dam via torch methods with six (6) inches on to the field of roof. Assure ply laps do not coincide with metal laps.
8. Install the modified flashing ply via torch methods over the base flashing ply, and nine (9) inches on to the field of the roof.
9. Fasten both flashing plies to the cant dam with a flat head fastener at eight (8) inches o.c.
10. Install pre-fabricated fascia cover over the cant dam and top of flashing plies.

L. Base Flashing For Non-Supported Deck (Wall Expansion Joint):
   1. Inspect the nailer to assure proper attachment and configuration. The wood cant strip should be mechanically attached to the vertical and horizontal wood nailers.
   2. Install compressible insulation in neoprene cradle between wall and vertical wood nailer.
   3. Prime vertical wall at a rate of one hundred (100) square feet per gallon and allow to dry.
   4. Install base flashing ply via torch methods covering entire wall and wrapped to top of wood nailer with six (6) inches on to field of the roof. Nail membrane at eight (8) inches o.c.
   5. Install modified flashing ply over the base flashing ply, nine (9) inches on to the field of the roof. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
   6. Install specified pre-manufactured bellows type wall to curb expansion joint cover in accordance with the project details. Fasten the expansion joint to the curb with neoprene gasketed screws at twelve (12) inches o.c. with fasteners and neoprene washers. Fasten the copper expansion joint to the masonry wall with approved fasteners at eight (8) inches o.c. Furnish continuous prefabricated transitions for all 90 degree junctures/corners. Terminate the end of the expansion joint in accordance with the manufacturer's recommendations.

M. Exhaust Fan/Passive Vent/Air Intake:
   1. Minimum curb height is eight (8) inches off the finished roof surface. As required, raise existing curbs to the required height. Prime vertical curb surface at a rate of one hundred (100) square feet per gallon and allow to dry.
   2. Set cant in cold applied insulation adhesive. Run all plies, including modified membrane, over cant a minimum of two (2) inches.
   3. Install base flashing ply covering curb with six (6) inches on to field of the roof.
   4. Install the modified flashing ply installed over the base flashing ply**,** nine (9) inches on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches o.c. Apply a three-course application of Silver-Flash aluminized mastic and mesh at all vertical seams.
   5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation. If the existing fan cover cannot fit over the installed flashing system, stop the flashing system at the top of the curb and fasten with cap nails at eight (8) inches on center. Install an 0.040" aluminum slip flashing under the fan cover and fasten to the curb at eight (8) inches on center with neoprene gasketed screws. The slip flashing shall cover the top of the flashing system three (3) inches minimum. Install new corner pieces on the fan cover as required to ensure the cover is watertight.

N. Plumbing/Soil Stack:
   1. Minimum stack height is twelve (12) inches.
   2. Run roof system over the entire surface of the roof. Seal the base of the stack with mastic
   3. Prime flange of new lead sleeve. Install properly sized lead sleeve set in ¼ inch bed of roof cement.
   4. Install base flashing ply by torch methods.
   5. Install modified membrane by torch methods.
   6. Seal the intersection of the membrane and stack with roof cement.

7. Turn sleeve a minimum of one (1) inch down inside of stack. For pipes 2 inches or less in diameter, lead top caps will be required.

O. 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 (1) ply of base flashing ply. Extend six (6) inches onto field of roof.
4. Install the modified membrane extending nine (9) inches onto field of the roof.
5. Fill pitch pocket half full with non-shrink grout. Let this cure and top off with specified two-part pourable sealer.
6. Caulk joint between roof system and pitch pocket with roof cement.

P. Pre-manufactured Curb for Equipment Support:
1. **Secure curb to roof deck.** Minimum curb height above top of roof is eight (8) inches. Install wood blocking on bottom, or top, of curb to achieve this height. Prime vertical at a rate of one hundred (100) square feet per gallon and allow to dry.
2. Set cant in adhesive. Run all field plies over cant of the pre-manufactured equipment support a minimum of two (2) inches.
3. Install base flashing ply covering pre-manufactured curb with six (6) inches on to field of the roof.
4. Install modified flashing ply over the base flashing ply**,** nine (9) inches on to field of the roof. Install flashing plies on top of the curb, and nail at eight (8) inches o.c. with cap nails. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
5. Install pre-manufactured cover. Fasten sides at twenty four (24) inches o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape/sealant between metal covers.
6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.

Q. Curb Detail/Air Handling Station:
1. Minimum curb height is eight (8) inches. Prime vertical at a rate of one hundred (100) square feet per gallon and allow to dry.
2. Set cant in adhesive. Run field plies over cant and up the curb a minimum of two (2) inches.
3. Install base flashing ply covering curb with six (6) inches on to field of the roof.
4. Install modified membrane over cant and up the curb a minimum of two (2) inches.
5. Install modified flashing ply over the base flashing ply**,** nine (9) inches on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches o.c. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
6. Install a 0.040” aluminum slip flashing under the existing counterflashing and over the roof flashing system and fasten to the curb at eight (8) inches on center with neoprene gasketed screws. The slip flashing shall cover the top of the flashing system three (3) inches minimum.

R. Wood Sleeper Support:

1. Approved wood of equal thickness to insulation will be placed into position where weight of object is over 12 pounds per square foot. Wood will be two (2) inches wider than base of object being supported.
2. Insulation will be installed up against wood sleeper.
3. Entire roof system will be installed over wood sleeper.
4. A walkpad will be installed in approved adhesive under the wood sleeper support.
5. Treated wood supports for the particular equipment would then be placed on the modified membrane roofing ply. Supports will be a minimum of four (4) inches wide.

S. Heat Stack:
1. Minimum stack height is twelve (12) inches.
2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric asphaltic sealant or roof cement.
3. Prime flange of new sleeve. Install properly sized sleeves set in ¼ inch bed of roof cement.
4. Install base flashing ply via torch methods.
5. Install modified membrane via torch methods.
6. Caulk the intersection of the membrane with roof cement.
7. Install new collar over cape. Weld collar or install stainless steel draw brand.

T. Surface Mounted Counterflashing:
1. The minimum flashing height for new counter-flashing is eight (8) inches. Maximum flashing height is thirty (30) inches. Prime vertical wall at a rate of one hundred (100) square feet per gallon and allow to dry.
3. Set cant in adhesive. Run the torch applied roofing ply over cant and stop at the top edge of the cant strip.
4. Install base flashing ply covering wall with six (6) inches on to field of the roof.
5. Install modified membrane roofing ply over cant and up the wall a minimum of two (2) inches.
6. Install modified flashing ply via torch methods over the base flashing ply, nine (9) inches on to the field of the roof. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
7. Install the specified termination bar even with the top of the flashing, and secure the termination bar through flashing and into wall every six (6) inches on center. Seal the top of the termination bar/flashing with a 3-course application of Silver-Flash and Garmesh or elastomeric asphaltic sealant.
8. Install new surface mounted counterflashing on the wall and secure with neoprene gasketed screws at eight (8) inches on center. End joints shall be interlocking and overlapping not less than 3". Corners shall be mitered and welded to a watertight condition. The bottom of the cap flashing insert shall project ¼" from the face of the wall with a down turned drip edge (provide a down turned hem in areas subject to human contact). New counterflashing shall cover the termination bar a minimum of four (4) inches.

U. Curb to Curb Expansion Joint:

1. Install wood blocking to achieve minimum flashing height of eight (8) inches. Chamfer top of curb. Prime vertical curb at a rate of one hundred (100) square feet per gallon and allow to dry.
2. Set cant in adhesive. Run the torch applied roofing ply over cant and stop at the top edge of the cant strip.
3. Install base flashing ply via torch methods covering curb with six (6) inches on to field of the roof.
4. Install modified membrane over cant and stop at the top edge of the cant strip.
5. Install modified flashing ply by torch methods over the base flashing ply, nine (9) inches on to the field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches o.c. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
6. Install a vapor retarder to serve as a retainer for insulation. Attach to top of the chamfered curb. Install compressible insulation inside vapor retarder.
7. Install specified pre-manufactured bellows type curb to curb expansion joint cover in accordance with the project details. Fasten the expansion joint to the curb with neoprene gasketed screws at twelve (12) inches o.c. with fasteners and neoprene washers. Furnish continuous prefabricated transitions for all 90 degree junctures/corners. Terminate the end of the expansion joint in accordance with the manufacturer's recommendations.

V. Area Divider:
1. Minimum curb height is eight (8) inches above roof membrane surface. Prime vertical at a rate of one hundred (100) square feet per gallon and allow to dry.
2. Set cant in adhesive. Run field plies over cant and up the curb a minimum of two (2) inches.
3. Install base flashing ply covering curb with six (6) inches on to field of the roof.
4. Install modified membrane over cant and up the curb a minimum of two (2) inches.
5. Install modified flashing ply over the base flashing ply, nine (9) inches on to field of the roof. Attach top of membrane to top of wood curb and nail at eight (8) inches o.c. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
6. Install a 0.040" aluminum coping cover the curb and roof flashing system, fasten to the curb at eight (8) inches on center with neoprene gasketed screws. The aluminum coping shall cover the top of the flashing system three (3)inches minimum.

W. Hybrid Wall Flashing with Pre-Manufactured Metal Edge Fascia
1. Prime the vertical wall at a rate of one hundred (100) square feet per gallon and allow to dry with asphalt primer a minimum of 12" above new roof surface where new modified bitumen flashing membrane will be installed.
3. Set cant in adhesive. Run all field plies, including modified membrane, to the top edge of cant strip and seal with asphalt mastic to a watertight condition.
4. Install base flashing ply up wall minimum of 12" via torch methods.
5. Install the modified mineral flashing ply via torch methods over the base flashing ply, nine (9) inches on to the field of the roof. Apply a three-course application of Silver-Flash aluminized trowel-grade mastic and mesh at all seams.
6. Install the specified termination bar even with the top of the flashing and secure the termination bar through flashing and into wall every six (6) inches on center. Seal the

top of the termination bar/flashing with a 3-course application of Silver-Flash and Garmesh or elastomeric asphaltic sealant

7. *Mechanically attach ½" thick exterior grade plywood to wall above modified bitumen flashing and around window and door openings.*
8. *Install new surface mounted counter-flashing with four (4) inch flange flat against plywood and above termination bar secured @ 12" o.c. New counterflashing shall cover the termination bar a minimum of four (4) inches.*
9. *Prime 4" counter-flashing flange along with the plywood sheathing and wood nailers above with single-ply primer and allow to dry.*
10. *Install minimum 60 mil. EPDM membrane fully adhered in bonding adhesive over four (4) inch counter-flashing flange and covering entire exposed wall. Using a heavy roller ensure membrane is smoothed out and fully adhered. Nail membrane at eight (8) inches o. c. to outside face of nailers on top of wall. Heat weld all seams using lister gun.*
11. *Install new metal fascia/extender system with continuous cleat. Fasten to wall structure or wood blocking as specified. Metal fascia extender shall cover the bottom of the wood nailer and top of wall (interface between wood blocking and wall) a minimum of two (2) inches.*
12. *Install specified pre-manufactured metal fascia system.*

X. Roof Edge with Gutter:

1. Inspect the nailer to assure proper attachment and configuration. **Thickness of wood must be the same height of the polyisocyanurate roof insulation and recovery board.**
2. Run field base roofing ply over the edge. Assure coverage of all wood nailers. Fasten the base roofing ply to the outside face of the wood blocking with ring shank cap nails at eight (8) inches o.c.
3. Install new metal extender with continuous cleat. Fasten to wood/masonry structure as specified. Metal fascia extender shall cover the bottom of the existing fascia a minimum of two (2) inches.
4. Over the field base roofing ply (i.e. before the installation of the cap sheet), install box gutter with 4" flange set in a bed of roof cement. Install internal straps and external brackets fastened every 30 inches on center in a staggered pattern.
5. Gutter flange will be secured with two (2) rows of approved stainless steel fasteners every 6" on center, staggered pattern.
6. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow to dry.
7. Strip in flange with base flashing ply covering entire flange six (6) inches past the inside edge of the wood nailer onto the field of the roof. Assure ply laps do not coincide with metal laps.
8. Install modified membrane roofing ply via torch methods over the field of the roof and base flashing ply (i.e. there is no separate modified membrane flashing ply).
9. Install a bead of rubberized asphaltic sealant at the edge of the flashing membrane and the box gutter.

Y. Reglet Mounted Counterflashing:

1. Remove existing reglet mounted counterflashing system to allow the installation of the new roof flashing and counterflashing system.
2. Minimum flashing height is eight (8) inches. Maximum flashing height is thirty (30) inches. Prime vertical wall at a rate of one hundred (100) square feet per gallon and allow to dry.
3. Set cant in adhesive. Run field plies over the cant and up the wall a minimum of three (3) inches.
4. Install base flashing ply covering wall set via torch methods with six (6) inches on to field of the roof.
5. Install modified membrane roofing ply over cant and up the wall a minimum of two (2) inches.
6. Install modified flashing ply via torch methods over the base flashing ply, nine (9) inches on to the field of the roof. Apply a three-course application of Silver-Flash mastic and mesh at all vertical seams.
7. Install the specified termination bar even with the top of the flashing and secure the termination bar through flashing and into wall every six (6) inches on center. Seal the top of the termination bar/flashing with a 3-course application of Silver-Flash and Garmesh or elastomeric asphaltic sealant.
8. Cut reglet in masonry one joint above flashing.
9. Install new reglet counterflashing with lead expansion wedges at 12” on center and seal reglet opening with high grade polyurethane sealant. End joints shall be interlocking and overlapping not less than 3”. Corners shall be mitered and fabricated to a watertight condition. The bottom of the cap flashing insert shall project ¼” from the face of the wall with a down turned drip edge (provide a down turned hem in areas subject to human contact). New counterflashing shall cover the termination bar a minimum of four (4) inches.

3.10 APPLICATION OF SURFACING

A. Prior to installation of surfacing, the completed roof system must be inspected and approved by the Owner and Manufacturer. An Infrared Scan is to be done at all roof areas to receive flood and gravel surfacing prior to the installation of the surfacing. If necessary, all repairs must be made by the Contractor prior to the application of the surfacing system. All bitumen materials must be properly cured per the manufacturer’s recommendations prior to applying the surfacing system.

B. Mineral Surfaced Membrane System: While bleed out from the side and end laps are still hot, hand broadcast minerals into asphalt bleed out for a monolithic appearance. If minerals are not properly installed in the bleedout, apply manufacturers’ PYRAMIC BASE COATING on all field seams of the modified membrane roofing ply at a rate of two (2) gallons per square, and immediately broadcast loose minerals into the coating while it is still wet.

C. Aluminum Roof Coating **(All Roof Areas U.N.O.):**
   1. Allow all cold applied mastics and roofing to properly dry and cure in accordance with manufacturer’s recommendations before installing the aluminum coating.

2. Base Coat Application: Brush or roller apply one (1) coat of the specified base coat at a minimum rate of 0.75 gallons per one hundred (100) square feet, per coat.

3. Top Coat Application: Brush or roller apply one (1) coat of the specified base coat at a minimum rate of 0.75 gallons per one hundred (100) square feet, per coat.

3.11 FIELD QUALITY CONTROL

A. Perform field inspection and testing as required by this specification.

B. Correct defects or irregularities discovered during field inspection.

C. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system

3.12 CLEANING

A. Remove any bitumen adhesive drippings from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by bitumen or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.13 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 07 55 00