SECTION 075216.20

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING (HOT ASPHALT APPLIED)

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.

B. RELATED SECTIONS
1. Division 06 10 53 Miscellaneous Rough Carpentry: Wood nailers, curbs and cant strips
2. Division 07 71 00 Roof Specialties: Copings, flashing and counterflashing
3. Division 07 72 00 Roof Accessories: Roof curbs and roof hatches
4. Division 22 40 00 Floor, Area and Roof Drains
5. Division 26 41 13 Lightning Protection for Structures: Lightning protection systems devices and connectors

1.2 SUMMARY

A. Section Includes:

1. Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing fully adhered in hot asphalt.

2. Roof Insulation.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Roofing Systems Manufacturer: Any of the manufacturers whose systems are specified under "Acceptable Roofing System Manufacturers", and herein called "manufacturer".

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure

to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system. Roofing system must meet the design intent and wind uplift capabilities associated with the uplift rating requirements listed in this specification and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-120.

2. Hail Resistance Rating: SH.

3. Clear Lake Campus to meet the requirements of the Texas Windstorm Act.

D. Energy Performance: Provide roofing system with initial Solar Reflectance Index not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency. Provide roofing membrane to meet applicable local Building Department requirements and initial solar reflectance not less than 0.70 and thermal emittance not less than 0.75 when tested according to one of the test methods listed below.

1. Solar Reflectance Test Methods: ASTM C1549, ASTM E903, ASTM E1175, or ASTM E1918.

2. Thermal Emittance Test Methods: ASTM C835, ASTM C1371, or ASTM E408.

E. Insulation R Value: Minimum R-19 Long Term Thermal Resistance (LTTR) as determined in accordance with CAN/ULC-S770 F. Roof Assembly must meet the current version of ASHRAE 90.1

1.5 SUBMITTALS

A. Product Data: Roofing-system manufacturer’s literature, including written instructions for evaluating, preparing, and treating substrate; technical data including tested physical and performance properties; and application instructions.

1. Provide for membrane and base flashing materials, and roofing cement, asphalt, primer, mastic sealant, and fasteners.

B. Include temperature ranges for storage and application of materials, and special

cold weather application requirements or limitations.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Include manufacturer's reviewed and approved details that are project specific. Manufacturer's generic details will not be accepted.

1. Base flashings and membrane terminations.

2. Tapered insulation layout including, crickets, saddles, and tapered edge strips, including amount and direction of slopes.

3. Dimensions and locations of all roof field, perimeter, and corners areas.

4. Base sheet/Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

5. Walkway pad plan and detail

6. Proposed temporary, watertight, tie-off details for each substrate type.

7. Interface with sheet metal components (per Section 07 62 00), including but not limited to:

a. Counterflashing
b. Stack flashing assemblies
c. Edge and fascia sections
d. Interface with coping cap assemblies (per Section 07 62 00)
e. Interface with roofing accessories including but not limited to:
f. Equipment curbs
g. Roof hatches
h. Expansion joints assemblies

D. Samples for Verification: For the following products:

1. Sheet roofing materials, including membrane cap sheet, of color specified.

2. Roof insulation.

3. Insulation cover board.

4. Walkway pads or rolls.

5. Six insulation fasteners of each type, length, and finish.

E. Installer's Certificate

1. Signed by roofing-system manufacturer, certifying that Roofing Installer complies with manufacturer's requirements to install specified, warranted, roofing system.

2. Submit evidence that Installer's existing company has minimum of 5 years continuous experience in application of specified materials. Submit list of at least five completed projects of similar scope and size, including:

    a. Project name.
    b. Owner's name.
    c. Owner's Representative name, address, and telephone number.
    d. Description of work.
    e. SBS-modified-bitumen materials used.
    f. Project supervisor.
    g. Total cost of roofing work and total cost of project.
    h. Completion date.

F. Manufacturer Certificate: Signed by roofing-system manufacturer, certifying that roofing system complies with specified requirements.

1. Written approval by membrane manufacturer for use and performance of membrane over specified board insulation, including that materials supplied for project comply with requirements of cited ASTM standards. Approval should also indicate materials are suitable for ASTM E 108, Class 1A roof and meet specified wind uplift classification.

2. Submit evidence of meeting performance requirements including applicable FMG assembly number.

3. Include all methods of attachment and attachment spacing for insulation and membrane system.

G. Certify that materials are free of asbestos.

H. Sample Warranty: Copy of roofing-system manufacturer's warranty, stating obligations, remedies, limitations, and exclusions. Submitted with bid.

I. Maintenance Data: For roofing system to include in maintenance manuals.

J. Prior to installation of the roof system, provide a written report with fastener withdrawal values (pull out tests) per ANSI SPRI FX-1 on all projects to verify the suitability of decking to accept a mechanically fastened insulation and/or membrane roofing system.

K. Following completion of Work, submit roofing-system manufacturer's inspection report of completed roofing installation and completed warranty; submit Installer's completed warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is FM Approvals approved for membrane roofing system identical to that used for this Project with a minimum of 10 years of documented experience.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Must have installations of specified materials in the local area in use for a minimum of 5 years.

C. Source Limitations: Obtain components including for membrane roofing system

D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

F. Testing: At Owners cost, Owner reserves the right to perform wind uplift testing of installed roof system per FM 1-52. Locations and quantities to be determined by Architect/Engineer.

G. Pre-Installation Testing: Provide fastener withdrawal testing at metal deck and lightweight insulating concrete deck areas per the latest version of ANSI/SPRI FX-1 testing procedures to verify fastener withdrawal resistance and identify fastener quantity and spacing

H. Fumes And Environmental Considerations (Note: Contractor may provide either Fume Recovery or Afterburner System depending on environmental concerns.)

1. Fume Recovery - Provide for the use of a Fume Recovery System to capture and filter bituminous fumes from the roofing kettle on the ground. The following Fume Recovery System is approved for work on this project:

    a. FRS-6000 Fume Recovery System as manufactured by National Tool & Equipment, Inc., 60 Boardman, OH 44512, 1-800-558-TOOL.
    b. Cleasby Eliminator Fume Emissions System as manufactured by Cleasby Mfg. Co., Inc., 1414 Bancroft Ave., San Francisco, CA 94124, 800-CLEASBY.

2. Afterburner: Provide for the use of a Fume Reduction System to reduce fumes and odors from the roofing kettle on the ground. The following fume reduction system is approved for work on this project:

    a. Reeves Afterburner/Safety Loader System as manufactured by Reeves Roofing Equipment Company, Inc., P.O. Box 720, Helotes, TX 78023, (210) 695-3567.
    b. Garlock FumeGuard Asphalt Fume Elimination System - Garlock FumeGuard as manufactured by Garlock Equipment Company, 2601 Niagara Lane, Minneapolis, MN 55447, (612) 553-1935.

c. Similar systems submitted for approval must be certified by the Environmental Protection Agency to remove 95% of odors and fumes.

3. Proper Usage: The Contractor shall ensure through training and proper supervision that the fume protection device is used correctly and maintained in good working order throughout the job. Doors, vents, and exhausts shall be kept closed to prevent smoke and fume escape. Operators failing to use the devices properly shall be dismissed from the job and replaced by a worker satisfactory to the Engineer.

4. Air Intake: The contractor will coordinate with the Roof Engineer and Owner to create a schedule for all rooftop air handler intake protection during the project.

5. Rooftop Air Intakes - The Owner will close or otherwise adjust rooftop air intakes for minimum attraction of roofing material fumes from rooftop work.

6. Vent Covers - Contractor will furnish plastic, charcoal, or other suitable covers for air intake vents, and shall install and remove such covers where requested to do so by the Owner

I. Pre-installation Roofing Conference: Conduct conference at Project site. Contractor's site foreman, roofing-system manufacturer's technical representative, Roofing Installer, Owner's Representative, Architect/Engineer shall attend.

1. Site use, access, staging, and set-up location limitations.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions. Including, but not limited to, the following: forecast weather conditions, storage and protection of materials prior to installation, surface preparation and pretreatment, environmental conditions.

3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

5. Review structural loading limitations of roof deck during and after roofing.

6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.

7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system and surrounding work during and after installation.

9. Review roof observation and repair procedures after roofing installation.

10. Reporting procedures.

11. Related project details and interfaces with adjacent work.

12. Testing and inspection requirements.

13. Notification procedures for inspections.

14. Documentation of modifications and repairs for project record.

15. Documentation required for manufacturer’s warranty.

16. Governing regulations and requirements for insurance and certificates if applicable.

17. Quality control and quality assurance plans.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components. Material storage procedures will be constantly monitored and strictly enforced.

B. Use canvas tarps for protection of moisture-sensitive roofing materials. If plastic coverings are used, venting of each package is required. Roofing-system manufacturer’s standard packaging and covering is not considered adequate weather protection.

C. Select and operate material handling equipment in a safe manner, guarding against damage to existing construction or newly applied roofing and conforming to manufacturer's recommendations of handling and storage.

D. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

E. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation. Manufacturer's packaging is not considered

adequate protection from moisture.

F. Handle and store materials and equipment on structures to safe loading of structure at time and to avoid permanent deflection of deck. Conspicuously mark wet or damaged materials and promptly remove from Site. Materials, having been determined by the owner/owner's representative to be damaged, shall be immediately removed from the construction site and replaced at no cost to the owner.

G. Store rolled asphalt based materials on ends only, unless otherwise required by roofing-system manufacturer’s written instructions. Discard rolls that have been flattened, creased, or otherwise damaged.

H. Do not store materials at locations where new roofing materials have been installed.

I. Remove and replace materials that cannot be applied within stated shelf life.

J. Flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow all precautions as outlined in manufacturer's Material Safety Data Sheets.

1.8 PROJECT CONDITIONS

A. Safety

1. Take all necessary precautions regarding worker health and safety when using solvents, adhesives and hot asphalt.

2. Store flammable liquid and materials away from open sparks, flames and extreme heat.

3. Take necessary precautions when using solvents and adhesives near fresh air intakes.

4. Comply with all OSHA requirements for construction.

B. Daily site cleanup shall be performed to minimize debris and hazardous congestion

C. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions e.g. extreme temperature, high winds, high humidity and moisture, permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

D. Verify existing dimensions and details prior to installation of materials. Notify Architect/Engineer of conditions found to be different than those indicated in Contract Documents. Architect/Engineer will review situation and inform Contractor and Installer of changes.

E. Comply with Owner's limitations and restrictions for site use and accessibility.

F. Install materials in strict accordance with safety requirements required by roofing manufacturer, Material Safety Data Sheets, and local, state, and federal rules and regulations.

G. Protection

1. Schedule installation sequence to limit access and utilization of the newly installed membrane for material storage, construction staging, mechanical and/or excessive foot traffic.

2. Protect roofing membrane, building surfaces, paving, and landscaping from traffic and roofing equipment. Provide temporary walkways constructed of plywood and set on protective material in traffic and construction areas.

3. Restore or replace all work or materials damaged by the roofing operation.

4. Remove protection materials upon completion of work.

5. Adverse weather could have a detrimental effect on adhesives, general production efforts or the quality of the finished installation. Contact manufacturer for recommendations and acceptable tolerances.

H. Daily seal: Ensure that moisture does not penetrate beneath any completed sections of the roof by sealing temporary roof terminations at the end of each work day and prior to the arrival of inclement weather. Inspect existing components for moisture intrusion along the temporary terminations at temporary cut-offs, tie-ins, and night seals after opening the seal on the next workday. Remove any wet, damp or moisture-damaged materials.

I. All construction debris shall be removed from the construction site and legally dispose of offsite.

1.9 WARRANTY

A. Special NDL Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, fasteners, stacks, drains, wall flashings, metal flashings and other components of membrane roofing system. Warranty shall cover wind speeds up to 74 MPH.

2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section,

including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:

1. Warranty Period: Five years from date of Substantial Completion.

C. Maintenance: Along with the issuance of the warranty, a set of instructions shall be included detailing preventative maintenance and noting a list of harmful substances which may damage the roofing membrane.

1.10 COORDINATION

A. Prior to installation of materials, a pre-roofing conference should be held with the roofing contractor, and owner/owner's representative(s) to discuss the specified roofing system coordinate its proper application and the expectations of all parties involved. The authorized roofing contractor and the owner/owner's representative shall notify all parties a minimum of fourteen days prior to the meeting.

B. Plan and coordinate the installation of the roofing system with other trades in such a manner to avoid membrane damage, keeping the complete installation weather tight and in accordance with all approved details and warranty requirements.

C. Manufacturer shall be available to make recommendations necessary to ensure compliance with project specifications and specification alternatives due to unforeseen job conditions.

PART 2 - PRODUCTS

2.1 GENERAL

A. All products and components for the roofing system shall be supplied by the roofing system manufacturer.

B. Components other than those manufactured and/or supplied by the roofing system manufacturer shall be submitted for review, prior to ordering. Any product(s) not specifically authorized in writing for the project by the roofing system manufacturer, shall be considered unacceptable and their performance excluded from the warranty.

C. Roofing membranes may be installed over or adhered directly to pre-approved insulation, cover board, decking or composites thereof. Contact manufacturer for additional information regarding compatible substrates.

2.2 SBS-MODIFIED ASPHALT-SHEET MATERIALS

A. SBS-Modified Bituminous Membrane Roofing: Manufacturers: Subject to compliance with requirements, provide products by one of the following, no

substitutions:

a. GAF Materials Corporation.
Cap Sheet: Ruberoid Energy Cap SBS 30 FR

b. CertainTeed Corporation:
Cap Sheet: Flintlastic FR Cap 30 Coolstar

c. Firestone Building Products
Cap Sheet. SBS FR UltraWhite Cap

2.3 BASE-SHEET MATERIALS

A. Base Sheet: Manufacturers heavy duty, SBS-modified, asphalt-impregnated and -coated sheet, with glass-fiber and/or polyester reinforcing mat, dusted with fine mineral surfacing on both sides.

1. GAF Materials Corporation
Base Sheet: Ruberoid Dual Smooth Base Sheet

2. CertainTeed Corporation
Base Sheet: Flintlastic® Ultra Poly SMS Base Sheet

3. Firestone Building Products
Base Sheet: SBS Smooth Base Sheet

B. Vented Base Sheet: Over lightweight insulating concrete deck, use manufacturers recommended vented base sheet mechanically attached to substrate.

2.4 BASE FLASHING SHEET MATERIALS

A. Smooth Surfaced Flashing Sheet. Same product as used in the field area of the roof and as follows:

1. GAF Materials Corporation
Base Sheet: Ruberoid Dual Smooth Base Sheet

2. CertainTeed Corporation
Base Sheet: Flintlastic® Ultra Poly SMS Base Sheet

3. Firestone Building Products
Base Sheet: SBS Smooth Base Sheet

B. Granule-Surfaced Flashing Sheet: Same product as used in the field area of the roof and as follows: Granule Color: High Reflectance White.

1. GAF Materials Corporation Cap Sheet: Ruberoid Energy Cap SBS 30 FR

2. CertainTeed Corporation

Cap Sheet: Flintlastic FR Cap 30 Coolstar

3. Firestone Building Products
Cap Sheet. SBS FR UltraWhite Cap

2.5 PENETRATION FLASHING SYSTEMS: use same membranes as installed in field of roof.

2.6 Liquid Flashing Systems: PMMA flashing system by the roofing manufacturer.

1. CertainTeed Corporation: Approved Liquid Flashing System

2. GAF: Topcoat Matrix MajorSeal

3. Firestone: UltraFlash

2.7 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. Plastic Foam Adhesives: 50 g/L.
b. Gypsum Board and Panel Adhesives: 50 g/L.
c. Multipurpose Construction Adhesives: 70 g/L.
d. Fiberglass Adhesives: 80 g/L.
e. Contact Adhesive: 80 g/L.
f. Other Adhesives: 250 g/L.
g. Non membrane Roof Sealants: 300 g/L.
h. Sealant Primers for Nonporous Substrates: 250 g/L.
i. Sealant Primers for Porous Substrates: 775 g/L.

B. Asphalt Primer: ASTM D 41.

C. Roofing Asphalt: ASTM D 312, Type IV.

D. Mastic Sealant: Polyisobutylene, plain or modified bitumen; non hardening, non migrating, non skinning, and nondrying.

E. Flashing Cement: ASTM D 4586, asbestos free, of consistency required by roofing-system manufacturer for application. Use for sealing laps in membrane or base flashing, surface or stripping flashing at equipment penetrations and

drains, or repairs to membrane or flashing.

F. Low-rise urethane adhesive: Used to adhere insulation and cover board within the roof assembly, as acceptable to roofing system manufacturer.

G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

H. Metal Flashing Sheet: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

I. Lead flashing for roof drains: 4-pound lead.

J. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane.

K. Termination Bar: Roofing-system manufacturer’s standard; aluminum bars, approximately 1-inch wide by 1/8-inch thick; with predrilled holes 6 inches on center.

L. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

2.8 ROOF INSULATION

General:

A. Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation.

B. For insulation that will be placed using adhesive, board sizes shall not exceed 4 ft. by 4 ft. maximum. Largest appropriate sized approaching, but not exceeding 4 ft. by 4 ft. as appropriate, shall be installed where possible. Using multiple smaller sized sections of insulation where larger sections would be more appropriate shall not be allowed.

C. Polyisocyanurate Flat Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces; 20-pounds-per-square-inch-minimum compressive strength in accordance with ASTM D1621; and meet flame spread requirements of ASTM E84.

D. Polyisocyanurate Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated. Drainage crickets and saddles will have a minimum thickness of 1/2” and a minimum slope of 1/2” per foot. Provide preformed saddles, crickets, tapered

edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. . Edges of material that are ½ inch or taller will require the use of tapered edge strips to taper edge to zero inches.

E. Cover Boards: ASTM C 1177; water-resistant, gypsum substrate, 4’ by 4’ in size. Edges of material that are ½ inch or taller will require the use of tapered edge strips to taper edge to zero inches.

F. Acceptable Products:

1. 3/8 inch Securock as manufactured by USG.

2. ½ inch DensDeck DuraGuard® Roof Board as manufactured by GP.

G. Fire Resistance:

a. Flame spread 0, smoke developed 0, when tested in accordance with ASTM E 84. Noncombustible when tested in accordance with ASTM E 136.

2.9 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Adhesive: Manufacturer’s standard adhesive formulated to adhere roof insulation to concrete substrate and subsequent layers of insulation and cover board to each other.

D. Wood Nailer Strips: Comply with requirements in Division 06 Section E.
Tapered Edge and Cant Strip: Fiber tapered edge strip, ½” to 0 by 6”. Cant strip and/or tapered edge to be mineral aggregate meeting HH-I-529B.

2.10 WALKWAYS

A. Walkway Pads: Same granulated cap sheet product as used in the field area of the roof and as follows: Granule Color:

1. Size: As standard with manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. The “Authorized” roofing contractor is responsible for ensuring appropriate system specific addendums from manufacturer.

B. The roofing contractor is responsible for providing a suitable substrate surface for the proper installation of the Roofing System, roof insulation and specified components.

C. Application of the roofing system constitutes an agreement that the roofing contractor has inspected and found the substrate suitable for the installation of the Roofing System.

D. The roofing contractor is responsible for coordinating the installation to ensure that the system remains watertight at the end of each working day

3.2 SUBSTRATE EXAMINATION

A. The roofing contractor is responsible for verifying that the deck condition and/or existing roof construction is suitable for the specified installation of the Roofing System.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.

2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.

3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."

4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

    a. Test for moisture by pouring 1 pint of hot roofing asphalt on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if test sample foams or can be easily and cleanly stripped after cooling.

6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

7. The application of adhesives or hot asphalt directly to structural concrete; existing smooth and/or granular BUR materials may require sealing or priming with an accepted asphalt primer prior to application.

8. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.

9. Examine surfaces for low areas that will not drain properly, foreign material, ice, wet insulation, unevenness or any other defect which would prevent the proper execution and quality application of the Roofing System as specified

C. Prepared substrate shall be smooth, dry, and free of debris and/or any other irregularities which would interfere with the proper installation of the Roofing System. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Installer and roofing-system manufacturer's representative shall examine substrate to ensure that it is properly prepared and ready to receive roofing system. Roofing-system manufacturer's representative shall report in writing to Installer and Architect/Engineer conditions which will adversely affect roofing-system installation or performance. Do not proceed with roofing-system installation until these conditions have been corrected and reviewed by Architect/Engineer.

E. Provide fastener withdrawal values (pull out tests) per ANSI SPRI FX-1 on all projects to verify the suitability of decking to accept a mechanically fastened insulation and/or membrane roofing system.

3.3 COORDINATION

A. Coordinate Work to ensure that new insulation and roofing materials and building interior are kept continuously dry and that continuous, watertight, new roofing system is provided. Coordinate:

1. With Owner's Representative.

2. With other trades to avoid or minimize work on, or in immediate vicinity of, installation in progress and completed new roofing.

3. To avoid or minimize adverse effects on completed new roofing.

4. Ensure that drains are operational at end of each workday or if precipitation is forecast.

3.4 SUBSTRATE PREPARATION

A. Steel Deck

1. Steel decking should conform to Factory Mutual (FM) guidelines for Class-1 insulated steel deck construction.

2. Steel decking should be constructed of a minimum 22 gauge cold rolled steel sheets with factory G-90 galvanized coating.

3. Panel profiles, (ribs) shall be formed to minimize deflection and provide suitable strength and integrity to support anticipated structural live and dead loads.

4. Steel decking shall be installed in compliance with specified design criteria and local building code requirements.

B. Concrete (Poured and/or Pre-cast)

1. Decking shall be installed in strict conformance with industry standards, practices and/or pre-cast panel manufacturer's installation requirements.

2. Decking shall be installed to provide positive slope and subsequent positive drainage of the new Roofing System.

3. Finished decking shall be properly cured and dry, prior to the installation of approved insulation.

4. Finished surface(s) to receive new roof system shall be smooth and level without significant surface depressions or irregularities. Camber differentials greater than 3/16 inch must be leveled using a cementitious grout.

5. Finished surfaces shall be free of moisture, dust, loose debris and any other irregularity that may hinder the proper performance of the new Roofing System.

6. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

3.5 SUBSTRATE PREPARATION

A. General

1. Roofing Contractor shall be responsible for informing the building owner/owner representative of any issues in regard to the condition and structural integrity of the existing decking.

2. The building owner/owner representative shall make and be responsible for the determination as to the proper method of treatment and/or replacement.

3. Re-roofing applications require fastener withdrawal tests to substantiate proposed attachment patterns for the new mechanically fastened insulation systems and/or membranes.

4. Re-roofing applications that require modification to the deck and/or insulation system should be installed to provide positive slope and subsequent positive drainage of the new Roofing System.

5. All terminations of the Roofing System must be constructed to prevent water from penetrating behind or beneath the new Roofing System. This includes water from above, beside, below and beneath the new system.

B. Removal of Existing Roof System(s)

1. Remove all existing roofing material(s), insulation, flashing, metal and deteriorated wood blocking and legally dispose off-site.

2. Remove only enough roofing to accommodate the day's work and ensure the exposed area can be made 100% watertight at the end of the day or first sign of inclement weather.

C. Steel Decks

1. All rotted and/or deteriorated decking shall be removed and replaced with like kind.

2. Areas of structurally acceptable steel decking exhibiting slight surface rust shall be properly cleaned, primed and painted prior to installing the approved insulation.

3. All decking shall be inspected for proper attachment and excessive deflection that would compromise the uplift performance of the new Roofing System.

4. Attachment and deflection deficiencies shall be repaired and brought into compliance with current, local building code requirements.

D. Concrete

1. Deteriorated decking shall be repaired and/or replaced with appropriate materials according to standard industry regulations and practices.

2. Repair any depressions and/or areas where reinforcing has become exposed.

3. When new insulation system is to be installed using hot asphalt or an approved adhesive:

   a. Cracks and or camber differentials greater than 3/16 inch shall be repaired using an appropriate cementitious grout or fill, and feathered to promote a smooth transition.
   b. Joints between pre-stressed panel units and over bulb-tees shall be taped, stripped or grouted with an appropriate cementitious fill.
   c. All surface irregularities shall be leveled to ensure complete contact with the decking for insulation bonded in hot asphalt or approved adhesives.

4. Where insulation is to be mechanically attached or ballasted, camber differentials and/or surface irregularities of up to 1/2 inch shall be acceptable.

5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

E. Lightweight "Insulating" Concrete All wet lightweight shall be removed and replaced with appropriate and/or compatible material.

2. Surface to receive new Roofing System shall be smooth and free of ridges, depressions and other irregularities.

3. Repair any depressions, irregularities and/or excessive deflection with compatible material.

3.6 ROOFING SYSTEM INSTALLATION

A. Install roofing membrane and base flashings according to roofing-system manufacturer's written instructions and applicable recommendations of NRCA/ARMA Quality Control Guidelines for Application of Polymer Modified Bitumen Roofing.

B. Install materials in strict accordance with safety requirements required by roofing-system manufacturer, Material Safety Data Sheets, and local, state, and federal rules and regulations.

C. Follow safety procedures of OSHA and other applicable governing agencies. Assume responsibility for Work area safety at all times.

D. Provide fully-charged fire extinguishers, appropriately sized and rated, and water within 50 feet of open flame.

E. Torch Safety for areas where torches are approved for use by Owner' Representative and Architect/Engineer.

F. Do not use wood-fiber cant strips or insulation.

G. Install continuous, glass-fiber, base sheet over combustible substrates.

H. Install metal flashings at penetrations, or protect with tight-fitting felt collar before torching.

I. Torches to have safety lever (pilot only or self-igniting). Do not use full-time torches.

J. Maintain fully-charged fire extinguishers, appropriately sized and rated, within 50 feet of torch work locations.

K. Walk job every day at least 1 hour after torches are out for fire watch.

L. Bitumen Heating:

1. Good Working Kettle - The roofing kettle shall be in safe working order with a working thermometer and thermostatic controls. Set up shall be in accordance with OSHA standards, and the surface upon which it rests shall be protected with sand, plywood, or a suitable tarp. All asphalt remaining on the

surface where the kettle was set up shall be cleaned up at the completion of the job. The kettle shall be cleaned prior to the commencement of this job.

2. Experienced Kettle Operator - The operator of the kettle shall be thoroughly trained in the safe operation and maintenance of the kettle, and he shall be dressed in safe protective clothing with proper safety equipment within easy reach at all times. The kettle operator shall wear a hard hat and face mask at all times in accordance with OSHA standards and standard industry practice.

3. Heating Practice - Under no circumstances shall asphalt be heated to or above its flash point. Application temperatures shall not be more than 25 degrees F. more or less than the equiviscous temperature (EVT). EVT information must be furnished by the asphalt manufacturer prior to commencement of work. In the absence of authoritative EVT certification for the specific batch of asphalt produced, the asphalt shall be heated to 475 to 500 degrees F. at the kettle, but not above 525 degrees F. Asphalt shall be applied as near the EVT temperature as possible.

4. Maintain adequate ventilation during installation of roofing materials. Notify Owner's Representative at least 1 week in advance of Work with materials with noxious vapors. Review application schedule and venting precautions with Owner's Representative prior to beginning application.

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

N. Coordinate installing roofing-system components so insulation and roofing membrane sheets are not exposed to precipitation, or left exposed at end of workday or when rain is forecast.

O. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.

P. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.

Q. Remove and discard temporary seals before beginning work on adjoining roofing.

R. Prohibit foot traffic and equipment movement over roofing system until adhesive has cured. Minimize foot traffic and equipment movement over base ply prior to installation of membrane top ply/cap sheet.

S. Cooperate with Architect/Engineer in performing inspections and testing of roofing system.

3.7 ROOF INSULATION INSTALLATION

A. General

1. Roof insulation shall be installed where by the long dimension of the board(s) run in parallel alignment and the short dimensions are staggered.

2. Insulation shall be installed with minimum joint dimensions and shall be tightly butted where possible. Maximum joint widths shall be 3/8 inch. Damaged corners shall be cut out and replaced with an insulation piece a minimum of 12 inch x 12 inch Pieces which are cut from larger panels and are smaller than one square foot are not acceptable.

3. Install no more than can be covered during the same working day.

4. Taper roof insulation to drain sumps using tapered edge strips. If an insulation layer is 1-1/2 inch or less, taper 12 inch from the drain bowl. If insulation thickness exceeds 1-1/2 inch, taper 18 inch from the drain bowl. All taper boards or pieces must be adhered or mechanically fastened with a minimum of two fasteners per board.

5. Tapered Edge Strip: Install tapered edge strip at the leading edge of the tapered insulation panels to provide a solid substrate for the cover board.

6. When a cover board and/or multiple layers are installed each layer should be offset from the previous layer a minimum of 12 inch on center.

7. At the end of each working day, provide a watertight cover on all unused insulation as to avoid moisture penetration.

B. Insulation Installation

1. Comply with roofing system manufacturer's written instructions for installing roof insulation.

2. Over nailable substrate, install one lapped vented base-sheet course and mechanically fasten to substrate according to roofing system manufacturer's written instructions.

(89-mm actual-) 16 feet apart for roof slopes steeper than 1 inch per 12 inches but less than 3 inches per 12 inches.

4. 48 inches apart for roof slopes steeper than 3 inches per 12 inches.

C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing membrane system with vertical surfaces or angle changes more than 45 degrees.

D. Mechanically Fastened Insulation: For metal roof decks, install the base layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.

2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

E. Adhered Insulation:

1. Board sizes shall not exceed 4 ft. by 4 ft. maximum. Largest appropriate sized approaching, but not exceeding 4 ft. by 4 ft. as appropriate, shall be installed where possible. Using multiple smaller sized sections of insulation where larger sections would be more appropriate shall not be allowed.

2. For insulation that will be installed using adhesive (not mechanically attached), provide adequate temporary ballast on insulation boards that is sufficient to fully compress each board into the adhesive until adhesive has set.

3. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/8 inch with insulation.

F. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or more, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing composite and non composite insulation in two or more layers, install non composite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

H. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

I. Tapered Edge Strip: Install tapered edge strip at the leading edge of the tapered insulation panels to provide a solid substrate for the coverboard.

J. Cover Board Installation: Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints a minimum of 6 inches in each direction from joints of insulation below. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing system manufacturer.

1. Adhere cover boards according to requirements in FM Approvals' "RoofNav" for specified Windstorm Resistance Classification.

2. Adhere cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3. Apply low-rise foam adhesive to underside, and bond cover board to

substrate.

4. Provide adequate temporary ballast on cover boards that is sufficient to fully compress each board into the adhesive until adhesive has set.

3.7 ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

1. Install roofing system according to roof assembly identification matrix and roof assembly layout illustrations in NRCA's "The NRCA Roofing and Waterproofing Manual" and to requirements in this Section.

B. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" and as follows:

1. Deck Type: I (insulated).

2. Adhering Method: M (mopped).

3. Number of SBS-Modified Asphalt Sheets: Two.

4. Surfacing Type: M (mineral-granule-surfaced cap sheet).

C. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

D. Where roof slope exceeds 1/2 inch per 12 inches, install roofing membrane sheets parallel with slope.

1. Back nail roofing membrane sheets to substrate according to roofing system manufacturer's written instructions.

E. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

F. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt, with joints and edges sealed.

2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.

3. Remove and discard temporary seals before beginning work on adjoining roofing.

G. Asphalt Heating: Heat and apply roofing asphalt according to roofing system manufacturer's written instructions.

H. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.8 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. SBS-Modified-Bitumen Membrane Installation: Install roofing membrane base ply and cap sheet.

B. Install all roofing membrane and flashing systems, and all accessory components in accordance with the Drawings and Specifications; unless the manufacturers printed instructions are more restrictive. Request for clarification shall be submitted in writing to the Engineer.

C. Unroll sheets and allow to relax before installing.

D. Cut out factory splices in top ply. Alternately, cover splice with full-width section of top-ply membrane that extends at least 6 inches beyond sides of splice.

E. Accurately align sheets without stretching, and maintain uniform side and end laps of minimum dimensions required by roofing-system manufacturer for selvage and non-selvage laps.

F. Start at low point of roof deck and shingle side laps with slope of deck where possible.

G. Stagger end laps at least 3 feet.

H. Extend sheets over and terminate about 1 inch above top of cants.

I. Embed base ply, and adhere to substrate, in a continuous coating of hot asphalt without breaks or voids.

J. End Laps - All end laps shall be lapped a minimum of 6", or as specified by the manufacturer, and all membrane laps shall show a "bleed-out" of between 1/4" and 1/2". Corners of the end laps are to be rounded.

K. Adhere top ply according to manufacturer’s recommendations with cold process adhesive or heat welded.

L. Broom each ply immediately to firmly embed into adhesive, free of wrinkles, creases, fish mouths, or air pockets.

M. Cut out wrinkles and fishmouths, and repair with same number of plies removed.

N. Prepare and prime non-selvage laps as recommended by roofing-system manufacturer.

O. Continuously bond and seal laps, leaving no voids.

P. Repair wrinkles and voids in lapped seams.

Q. No Foot Traffic on New Membrane - Set up points, charge points, debris chutes, asphalt filling points, drinking water containers and all other destination facilities shall be located in such a way as to preclude traffic over the newly installed membrane. No workers shall walk on the newly completed membrane for at least thirty minutes after installation to allow for cooling of the asphalt to prevent compression and displacement of asphalt due to point loading or concentration of weight due to a person's foot or equipment.

R. Embed loose cool roof granules in bleed out or cool roof reflective coating, in accordance with the membrane manufacturer's recommendations, at side and end laps which and at minor asphalt, primer, or adhesive spillage on finished membrane surfaces.

S. At locations where asphalt, primer, or adhesive spillage on finished membrane surfaces exceeds 1 square foot, install additional top ply of membrane.

T. Install modified bituminous roofing membrane cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:

1. Adhere to substrate in a solid mopping of hot roofing asphalt applied at not less than 425 deg F.

2. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.

U. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.

2. Apply roofing granules to cover exuded bead at laps while bead is hot.

V. Install roofing membrane sheets so side and end laps shed water.

3.9 FLASHING AND STRIPPING INSTALLATION

A. General: Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrate according to roofing-system manufacturer's written instructions.

B. Base Flashing:

C. Accurately align base flashing sheets without stretching, and maintain uniform side and end laps required by roofing-system manufacturer for selvage and non-selvage laps.

D. Start wall and curb base flashing at low point of roof deck and shingle with slope of deck.

E. Flashing Plies not to exceed 39 inches in width. Extend base flashing plies to top of curbs, to within 1 inch of counterflashing reglets, at least 8 inches above finished surface of roofing system, and 4 inches onto field of roofing membrane. At locations where height of wall exceeds height acceptable to roofing-system manufacturer, comply with recommendations of roofing-system manufacturer for flashing high walls. Recommendations include flashing in two stages: bottom half to recommended maximum height preceded by top half over remainder of wall.

F. Bond and seal laps, leaving no voids. Repair wrinkles and voids in laps and lapped seams. Prepare and prime non-selvage laps as recommended by roofing-system manufacturer.

G. Install at least one ply of base flashing membrane same day that roofing membrane is installed to provide temporary watertight seal.

1. Flashing Sheet Application: Adhere flashing sheet to substrate in solid coating of flashing cement. Press sheet firmly into place to ensure continuous adhesion to substrate with no voids, wrinkles, or un-adhered base flashing.

2. Cut sheets off end of roll and install vertically, working to selvage edge.

3. For sheets without selvage edges or where selvage edge cannot be provided, limit length of sheets to 5 feet maximum. Prepare and prime non-selvage edges as recommended by roofing-system manufacturer.

4. Stagger end lap seams in top ply at least 6 inches from lap seams in bottom plies.

H. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.

I. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing using termination bar.

1. Seal termination bar with a 3 course application of fiberglass mesh and flashing cement.

J. Install roofing membrane cap-sheet stripping where metal flanges and edgings are set on membrane roofing according to roofing system manufacturer's written instructions.

K. Roof Drains:

1. Sump insulation a minimum of 24 inches in each direction as measure from the center of the drain.

2. Install membrane bottom plies. Extend 1 inch beyond inside edge of drain bowl flange.

3. Apply primer to both sides of 30-inch-by-30-inch, lead flashing, and allow to dry. Center lead flashing over drain and set in continuous application of modified-bitumen mastic. Trim lead flashing to extend 1 inch beyond inside edge of drain bowl flange.

4. Install additional 40-inch-by-40-inch, base-flashing, backer sheet or bottom ply over lead flashing.

5. Install membrane cap sheet over base flashing. Extend 1 inch beyond inside edge of drain bowl flange.

6. Trim flashing as necessary to 1 inch from inside edge of drain bowl flange.

7. Install clamping ring and drain strainer.

8. Install clamping ring same day that base flashing installed to prevent water back-up under membrane.

9. Remove and reinstall clamping ring when membrane top-ply installed, if installed at later time.

10. Securely fasten clamping ring to provide continuous compression of drain flashings.

11. Install strainer dome.

12. At end of project, test drains for watertightness and ensure that drains flow freely.

3.10 EQUIMENT AND EXPANSION JOINT CURBS

A. Refer to general base flashing installation requirements and the following additional procedures.

B. At wood curbs for equipment and expansion joint assemblies, extend base ply of flashing membrane up and over top of curb, and secure with nails to blocking.

C. Extend cap flashing membrane sheet up vertical surface of curb and terminate at top edge as shown on Drawings. For expansion joint locations, seal top edge of cap sheet with mastic. Securement shall be by fasteners that attach expansion joint assembly to curbs.

D. For curbs where integral sheet metal flashing is used but not attached to face of curb, install termination bar through cap sheet as shown on Drawings with fasteners at 6” on center

E. Equipment Penetrations. Flash per Drawing details or per roofing-system manufacturer’s recommendations.

F. Prime flange of sheet-metal flashing, allow to dry, and set in modified-bitumen mastic.

G. Apply sealant at base flashing termination on sheet metal flashing.

3.11 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.

1. Fully adhere walkway pads in cold-applied adhesive.

B. Use only full-size units, except partial units at corners if necessary to provide neat, finished appearance.

C. Provide 2 inches minimum between adjacent units. Extend walkway 6 inches minimum beyond edges of equipment or supports.

D. Sweep loose surfacing material from walkway locations.

E. Cap Sheet Strips: Set strips, in lengths not exceeding 10 feet, in heavy application of asphalt mastic or same bitumen used to install roofing system, in accordance with recommendations of walkway and roofing-system manufacturers. Walkways shall be fully adhered to roofing cap sheet.

3.12 FIELD QUALITY CONTROL

A. Roof cement shall not be incorporated into the roof membrane or flashing system.

B. Architect/Engineer will inspect roofing system at various stages of construction and at completion.

C. Testing Agency: Engage a qualified testing agency to perform tests and inspections and to prepare test reports.

D. Test Cuts: Test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:

1. Approximate quantities of components within roofing membrane will be determined according to ASTM D 3617.

2. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with criteria established in Appendix 3 in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

3. Repair areas where test cuts were made according to roofing system manufacturer's written instructions.

E. Infrared Survey: If roofing cap sheet is not installed immediately after the smooth surfaced base sheet is installed (Phased Construction), contractor shall provide an infra-red survey of entire roof area. Survey shall be performed by organization that is approved by the Architect. Infra-red survey and subsequent report shall be performed prior to the installation of the roofing cap sheet.

F. Manufacturer’s Inspections: Arrange for the roofing systems manufacturer to provide qualified technical personnel for onsite observation and instruction full time at beginning of membrane installation to establish project standard and thereafter as the manufacturer deems necessary, but not less than 1 time every two weeks when roofing membrane and related work is being performed. A field observation report from each visit will be generated and submitted to the Engineer within 48 hours of the visit.

G. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

H. Roofing system will be considered defective if it does not pass tests and inspections.

1. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

2. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.13 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

D. Accompany the manufacturer's technical inspector, and assist with equipment and workmen if necessary to provide access to the roof. Correct all defects noted during the inspection.

3.15 TEMPORARY SEALS

A. At the end of each working day or at the sign of rain, install temporary, 100% watertight seal(s) where the completed new roofing adjoins the uncovered deck or existing roof surface.

B. The authorized roofing contractor shall create and maintain the temporary seal in such a manner to prevent water from traveling beneath the new and/or existing roof system.

C. The use of plastic roofing cement is permissible when sealing to an existing built up roof.

D. If water is allowed to enter beneath the newly completed roofing, the affected area(s) shall be removed and replaced at no additional expense to the building owner.

E. Prior to the commencement of work, cut out and remove all contaminated membrane, insulation, roof cement or sealant and properly dispose off site.

3.16 LIGHTNING PROTECTION

A. The installation of lightning protection must be coordinated with the authorized roofing contractor, certified lightning contractor and the building owner.

B. The lightning protection must be installed in such a manner that base plates, air terminals and cables do not penetrate the roofing membrane without the use of pre-approved flashing details.

C. Cables and air terminals may be attached to the membrane using base plates and an approved construction adhesive or by welding intermittent strips of membrane over the base plates and cables to the roofing. Contact manufacturer for specific adhesive recommendations.

D. Recommendations regarding the selection of adhesives or alternative affixing of lightning protection systems to the membrane does not in any way imply a warranty covering their performance or ability of the adhesives to remain affixed to the membrane.

3.17 COMPLETION

A. Remove any and all debris, excess materials and scrap of any kind from the roof and surrounding premises prior to demobilization.

B. Inspect all field welds, detailing and terminations to ensure a 100% the watertight installation.

3.18 WARRANTY INSPECTION

A. Upon completion of the project, the authorized roofing contractor shall complete and submit the Project Completion Notice to manufacturer.

B. Upon receipt of the notice of completion, a manufacturer's representative will schedule an inspection with a representative of the authorized roofing contractor to thoroughly review the installation and verify compliance with the manufacturer's requirements.

C. Any corrections or modifications necessary for compliance with the specifications and acceptance for warranty (punch list) will be noted on the Final Inspection for Warranty Form.

D. Upon completion of all punch list items and final acceptance of the installation, a warranty as authorized by the approved manufacturer Notice of Award and Warranty Request Form will be issued.

3.19 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <Insert name of Owner>.

2. Address: <Insert address>.

3. Building Name/Type: <Insert information>.

4. Address: <Insert address>.

5. Area of Work: <Insert information>.

6. Acceptance Date: <Insert date>.

7. Warranty Period: <Insert time>.

8. Expiration Date: <Insert date>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or

indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. lightning;
    b. peak gust wind speed exceeding <Insert wind speed> mph;
    c. fire;
    d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. vapor condensation on bottom of roofing; and
    g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.

3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe

than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>.

2. Name: <Insert name>.

3. Title: <Insert title>.

END OF SECTION 075216