

SECTION 07510
MODIFIED BITUMEN ROOFING SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section.

1.2 SECTION INCLUDES:

- A. Multi-ply mop applied modified bitumen roofing system consisting of three membrane interplys and a mineral surfaced fire rated cap sheet. System shall be installed as follows:
 - 1. Hot mopped to an approved rigid insulation substrate.
 - 2. Mechanically attached to an approved lightweight concrete substrate.
- B. Flashing material shall be an approved system by the roofing manufacturer for use with their roofing system.
- C. Torch Applied

1.3 REFERENCES

- A. FS-HH-I-1972/GEN – Polyisocyanurate Insulation.
- B. ASTM D41 – Standard Specification for Asphalt Primer for Used in Roofing, Damp-proofing, and Waterproofing.
- C. ASTM D312 – Standard Specification for Asphalt Used in Roofing.
- D. ASTM D2178 – Standard Specification for Asphalt-Impregnated Glass Felt used in Roofing and Waterproofing.
- E. NRCA - Roofing and Waterproofing Manual, Current Edition.
- F. UL - Fire Hazard Classifications.
- G. UL – Roofing System & Material Guide.
- H. ASTM D2842 – Standard Test Method for Water absorption of Rigid Cellular Plastics.
- I. ASTM E96 – Standard Test Method for Water Vapor Transmission of Materials.
- J. ASTM E108 Standard Test Methods for Fire Test of Roof Coverings.
- K. Current ASCE Minimum Design Loads for Buildings and Other Structures
- L. Florida Building Code.

1.4 SUBMITTALS

- A. Product Data: Submit specifications, installation instructions and general recommendations from manufacturers of roofing system materials, for type of roofing required.
 - 1. Include data substantiating that materials comply with requirements, including list of materials proposed for use and manufacturer's product data sheets for other products.
 - 2. Provide sample copies of specified warranties, including evidence of application for warranty from Manufacturer.
 - 3. Include sample copy of maintenance instructions for use during construction complete Manufacturers instructions for periodic inspection and maintenance of roofing system.
- B. Shop Drawings: Submit complete installation details showing roof configuration, sheet layout, seam locations, flashing, roof slopes, details at each different perimeter condition and special conditions.

1. Provide fastening pattern layout in compliance with the Current ASCE Minimum Design Standards.
 2. Copy of product approval for the system, per FBC requirements.
- C. Samples: Submit 12" x 12" square of membrane with granule surface and base sheets.
- D. Certificates:
1. Submit Manufacturers certification that materials and components furnished conform to specified requirements and that materials furnished are compatible for decks indicated.
 2. At completion of work, submit Manufacturers certification that roofing system was installed in accordance with Manufacturers warranty requirements.
- E. Safety Provisions: Submit a complete detailed schedule of special safety provisions implemented to insure the health and safety of the people. Work shall not start without prior acceptance of these provisions by the Owner. These provisions shall include but are not limited to:
1. Maintaining existing exits and fire protection.
 2. Dust free operation.
 3. Sequencing of work.
 4. Removal of debris from work.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Obtain primary roofing materials from a single manufacturer, with at least 10-years of documented experience in the roofing material business. Provide secondary materials as recommended by manufacturer of primary materials.
- B. Installer: Company specializing in installation of bituminous roofing with minimum five-years of continuous documented experience operating under the same name, with extensive experience in the application of roofs of similar size and type, and approved in writing by manufacturer of accepted roofing system.
- C. All work shall conform to NRCA Roofing and Waterproofing Manual, Florida Building Code, the FECC and to manufacturers' strict instructions.
- D. Requirements of Regulatory Agencies:
1. Underwriter's Laboratories, Inc.: Class A fire hazard classification.
 2. Approvals: Roofing system shall meet the Current ASCE Minimum Design wind requirements for the roofing system.
- E. Pre-Installation Conference:
1. Prior to installation of roofing system, conduct a pre-installation site conference at.
 2. Attendance: Owners Representative, Architect, Contractor, job superintendent, subcontractors and suppliers related to roofing work.
 3. Agenda: Review project conditions, application, coordination with other work, and protection of completed roofing.
- F. Inspections: Provide on-site weekly inspections by Owner's representative during and after installation of roofing system.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible, including required fire resistance classification labels.
- B. Store and handle material per manufacturers requirements.
- C. Store rolled goods on end on clean raised platforms with a breathable weather protective covering, such as canvas, when stored outdoors (Polyethylene or other non-breathable plastic coverings are not acceptable).
- D. Provide continuous protection of materials against wetting and absorption; remove wet materials from project site.

- E. Rooftop Storage: Disperse material evenly across the roof to avoid concentrated loading.

1.7 PROJECT CONDITIONS

- A. Proceed with roofing work only if existing and forecasted weather conditions permit work in accordance with manufacturers' recommendations and warranty requirements.
- B. Do not apply roofing membrane to damp deck surface.

1.8 WARRANTIES

- A. Installer's Warranty: Provide written warranty signed by the roofing Installer and the Contractor agreeing to replace or repair defective components and workmanship of the total roofing system, including roofing membrane, flashing, insulation and roofing accessories as required to maintain the total roofing system in a watertight condition at no expense to the Owner, for a period of two-years after the date of substantial completion of the entire Project.
- B. Manufacturer's Warranty: Provide written warranty signed by the Manufacturer of the primary roofing materials agreeing to replace or repair defective roof membrane and flashing materials and workmanship as required to maintain the roofing system in a watertight condition at no expense to the Owner for a period of 20-years after date of substantial completion of the entire Project. In addition provide written warranty signed by the manufacturer of primary roofing materials agreeing to allow Owner to make emergency repairs to roof without voiding manufacturer's warranty.
 - 1. In conjunction with issuance of the above warranty, include.
 - a. Instructions detailing preventative maintenance required to maintain the warranty.
 - b. List of substances, which may damage the membrane.
 - c. Specifications on repair of the membrane Owner may do without voiding warranty.
 - 2. Warranty shall include coverage for damage to building resulting from failure of roof system to resist penetration of water with no dollar limit to the value of repairs or replacements covered.
 - 3. The built-up roofing membranes and lightweight insulation as well as all accessories and appurtenances shall comprise the "Roofing System" and shall be part of a single source warranty.
- C. Provide on-site inspections by Owner's representative during installation of roofing.
- D. Manufacturer's Certification: Submit written certification signed by the manufacturer stating that the roofing system manufacturer will provide warranties, inspection and Report Services specified herein. NOTE: Warranty terms shall be submitted with the post-bid package.
- E. Provide acceptance letter from the roofing manufacturer that this specification meets the requirements of the 20-year warranty and that no criteria specified herein will impact such warranty.

PART 2 PRODUCTS

2.1 ROOFING SYSTEM

- A. Approved Source Manufacturers: Provide one of the following modified roofing membrane systems with asphalt bitumen and modified bitumen granule cap sheet, modified to meet the characteristics specified herein if required.
 - 1. Rigid Substrate: GAF, Ruberoid M.B. Roofing System I-3-1-MGPFR.
 - 2. Rigid Substrate: Manville, 4CID-FR.
 - 3. Lightweight Substrate: GAF, Ruberoid M.B. Roofing System I-3-1-MGPFR.
 - 4. Lightweight Substrate: Manville, 4CLD-FR.

5. Soprema, Sopralene or Elastophene system equal to the GAF and Manville system.
 6. Other pre-approve equal.
- B. Membrane Characteristics: Three-layers of inter-ply felt sheets and mineral surfaced cap sheet.
1. Roof covering shall be Class A fire rating.
 2. Three-Modified Inter-ply Membrane Sheets: Premium, asphalt coated, fiberglass base sheet, ASTM D2178, Type VI.
 3. One-Modified Bitumen Cap Sheet: A fire resistant, premium, fiberglass/polyester composite reinforced, granular surfaced, modified bitumen cap sheet.
 4. Primer: ASTM D41.
 5. Roofing Cement: ASTM D4586, asbestos-free.
 6. Mineral Granules: Size No. 11 ceramic, white in color, free of fines and dust, unaffected by airborne acids and ultraviolet radiation.
- C. With pre-approval from the FI Tech Architect, may substitute 20-year 3-ply system, such as Manville 3CID-FR for rigid substrate or CLD-FR for lightweight substrate.

2.2 ACCESSORIES

- A. Roof System Vents: Manufacturer's standard spun aluminum one-way venting.
- B. Fiber Cants: Fire rated, asphalt impregnated, wood fiberboard, pre-formed to greater than a 45° angle. (4" face minimum) fastened with roofing mastic.
- C. Curb Mounted Expansion Joint: Sheet EPDM reinforced with closed cell urethane backing.
- D. Exterior Expansion Joint Covers: Manville Expando-O-Flash at roof and Expando-O-Guard at exterior vertical and horizontal wall surfaces or equal.

2.3 RIGID INSULATION

- A. Rigid Insulation: Tapered fesco foam composite system, composed of a high thermal polyisocyanurate foam core bonded to a perlite board on one side with square edges, and factory tapered to roof slopes as shown on the drawings.
 1. Insulation thickness as shown on drawings to a minimum of 2" at all roof drains shall provide a minimum average roof R-Value of 30.
- B. Fastening Devices: Provide membrane manufacturers insulation fastening system of appropriate size, nailing pattern as designed and tested in the Product Approval documents.

2.4 LIGHTWEIGHT CONCRETE INSULATION

- A. Lightweight Concrete Insulation: Provide Zonolite "Insulcel" cellular insulating concrete with insulperm insulation board stair stepped as required by Siplast Construction Products. Acceptable equals are products by Elastizell or Celcore.
 1. Insulation thickness as shown on drawings to a minimum of 2" at all roof drains shall provide a minimum average roof R-Value of 30.
- B. Fastening Devices: Provide membrane manufacturers insulation fastening system of appropriate size, nailing pattern as designed and tested in the Product Approval documents.
- C. Provide vented deck system for lightweight concrete.

PART 3 EXECUTION

3.1 PRE-INSTALLATION REQUIREMENTS

- A. Do not start the installation of accessories or membrane without the presence of the Manufacturer's Technical Representative. This requirement shall not be waived.

1. Due to the incompatibility of various materials with the roofing membrane, the Representative shall inspect the substrate and shall have a barrier applied for complete separation and protection of the roofing membrane and accessories.
- B. Install all vents, drains, curbs, nailers, blocking, insulation and projections through the roof before starting membrane installation.
 1. Only with Architect's written approval, proper provision for re-inspection, and continued warranty protection can these items be installed after the membrane's installation.

3.2 PREPARATION OF SUBSTRATE

- A. Insulation: The applicator shall carefully inspect all surfaces to receive insulation and assure all surfaces are satisfactory prior to beginning installation. Beginning insulation installation constitutes acceptance of substrate without recourse.
- B. Roofing Membrane: The manufacturer's Technical Service Representative shall carefully inspect the substrate receiving the roofing and provide a written report.
- C. Install all nails, blocking, vertical surfaces, etc. prior to proceeding with membrane installation.
- D. Verify that all units are properly secured in place prior to proceeding with membrane installation.

3.3 RIGID INSULATION INSTALLATIONS

- A. Insulation Board:
 1. Mechanically fasten insulation to the metal deck to meet Current ASCE Minimum Design wind uplift requirements.
 2. Hot mop insulation to the structural concrete deck to meet Current ASCE Minimum Design wind uplift requirements.
- B. Install insulation board with the perlite layer facing up.
- C. Install tapered insulation boards back from roof drains for positive drainage as shown on the drawings.

3.4 LIGHTWEIGHT CONCRETE INSTALLATIONS

- A. Slurry: Cover the metal deck with a 1/8" inch slurry coat of the lightweight insulating fill.
- B. Insulation Board: Place insulation board in the 1/8" slurry coat.
 1. Place insulation board within 30 minutes of slurry coat placement.
 2. Place insulation board in a manner that provides full contact of slurry to board.
 3. Install insulation board in a stair-stepped configuration to achieve the minimum 1/8" per foot slope.
- C. Lightweight Insulating Fill: Within 4 hours of insulation board placement, install a minimum of 2" of lightweight insulating fill over the insulation board, screened to an even surface for the receive the roofing membrane.
- D. Do not install more insulation each day than can be covered with a watertight cover before end of day or start of inclement weather.
- E. Venting: Vent insulation board to roof edges as recommended by manufacturer.

3.5 INSTALLATION OF ROOFING MEMBRANE SYSTEM – RIGID INSULATION

- A. Install in accordance with accepted roofing manufacturer's specification, roof deck manufacturer's recommendations, and as specified below.
 1. Phased construction of roofing membrane is strictly prohibited.
- B. Apply 3-plys of felt sheets and one mineral surfaced cap sheet hot mopped over a tapered rigid insulation system.
 1. Hot mop one layer of the base ply to the rigid substrate in a pattern to meet Current ASCE Minimum Design Standards as per manufacturer recommendations for wind uplift classification.
 2. Apply felt sheets with a minimum rate of application of modified bitumen asphalt of 23 to 45 lbs. per 100 sq ft between layers.

3. Apply cap sheet with minimum rate of application of modified bitumen asphalt of 20 to 30 lbs. per 100 sq ft. Apply cap sheet parallel to the underlying roofing and lap, so that the flow of water is over or parallel to, but never against the laps.
 4. Solid mop heated bitumen under and between felts and provide complete uniform coating without bitumen displacement. Felt shall not touch felt.
 5. Lay felts parallel to long dimension of roof. Do not work on or allow point loads on newly applied felts.
 6. Broom or press felts into heated bitumen providing tight, smooth lamination without wrinkles, buckles, kinks, or fish-mouths. Cut out and patch fish-mouths.
 7. Complete application of roofing system without pockets or blisters. Cut-off felts at top of cant strips.
 8. Provide mastic membrane stripping at all vertical laps and coat with non-asbestos aluminum roof coating.
 9. Embed mineral roofing granules into overrun of hot bitumen at sides and edges of cap sheet laps for an overall granule-surfaced roof.
- C. Complete installation of roofing system up to line of termination of day's work. Install temporary water cut-offs of plastic cement and base sheet strips at end of each day's work. Remove upon resumption of work.
- D. Composition Base Flashing:
1. Install in accordance with requirements of roofing system manufacturer.
 2. Install where roofing system abuts vertical surfaces and at other locations detailed.
- E. Flashings: Install metal flashings, and then flash with torch applied flashing material in such a manner as to prevent leaks.
- F. Venting: Provide aluminum one-way vent stacks for every 900 s.f. of roof area or as recommended by manufacturer.

3.6 INSTALLATION OF ROOFING MEMBRANE SYSTEM – LIGHTWEIGHT CONCRETE

- A. Install in accordance with accepted roofing manufacturer's specification and recommendations, and as specified below.
1. Phased construction of roofing membrane is strictly prohibited.
- B. Apply one-base sheet mechanically, two-glass felts, and one-mineral surfaced cap sheet over cellular lightweight insulating concrete system.
1. Mechanically attach the base sheet to the new lightweight concrete deck in a pattern to meet Current ASCE Minimum Design Standards as per manufacturer recommendations and the Product Approvals for wind uplift classification, minimum 130 mph or as specified by structural engineer.
 2. Felt sheet membrane application:
 - a. Remove the roll wrapping tape and labels before membrane installation.
 - b. Unroll first roll of membrane completely and align. Remaining rolls shall be unrolled approximately halfway in order to align the side laps and ensure the required end lap is maintained. Membrane layout may be addressed by different method (s); however, installation shall start at the lowest point and continue in a shingle method.
 - c. Re-roll one end of the roll, approximately half way to facilitate alignment.
 - d. Broom all plies in coal tar and lap 24 $\frac{3}{4}$ ", so that in no place shall felt touch felt.
 - e. Roll up the un-adhered half of the membrane sheet and repeat the above procedure to complete the installation of the roll.
 - f. Apply membrane: seal seams, ends, and permanently waterproof.
 - g. Apply membrane smooth, free from air pockets, wrinkles or tears.
 - h. Extend membrane up cant strips a minimum of 4" onto vertical surfaces.
 - i. Seal membrane around roof penetrations.
 - j. Keep rooftop traffic to a minimum shortly after installation of membrane in order to minimize damage.
- C. Complete installation of modified roofing system up to line of termination of day's work. Install temporary water cut-offs of plastic cement and base sheet strips at end of each day's work. Remove upon resumption of work.

- D. Base Flashing:
 - 1. Install in accordance with requirements of roofing system manufacturer.
 - 2. Install where roofing system abuts vertical surfaces and at other locations detailed.
- E. Roof Edging:
 - 1. Prior to application of metal edging treatment, extend roofing felts up over tapered edging and secure to wood nailer with base felt extended and folded back over ply felts.
 - 2. After metal edging is in place, flash as recommended by roofing manufacturer.
- F. Flashings: Install metal flashings in such a manner as to prevent leaks.
- G. Venting: Provide aluminum one-way vent stacks for every 900 s.f. of roof area or as recommended by manufacturer.

3.7 FIELD QUALITY CONTROL:

- A. Manufacturer's Field Service: Provide periodic inspections of roof application by qualified technical representative of roofing manufacturer.

3.8 CLEANING

- A. Clean up debris, excess materials and equipment and remove from site.
- B. Remove bitumen from surfaces other than those requiring bituminous roof coatings.
- C. Remove bituminous markings from finished surfaces.

3.9 PROTECTION:

- A. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80°F.
- B. Restore to original condition or replace work or materials damaged during handling of bitumen and roofing materials.
- C. Do not transverse any walkways where new work has been completed where traffic must continue over finished roof membrane, protect surfaces.
- D. Do not throw or drop debris from roof, use chutes or high lift trucks.

END OF SECTION