

**SECTION 07 52 00
MODIFIED BITUMEN MEMBRANE ROOFING**

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. Two ply system; modified bitumen roofing system, consisting of base ply and granular surface cap sheet, over light weight concrete, structural concrete and/or metal deck.
- B. Three ply system (Optional); modified bitumen roofing system, consisting of anchor sheet, base ply (interply), and granular surface cap sheet, over light weight concrete, structural concrete, and/or metal deck.
- C. Flashing material system by the roofing manufacturer for use with their roofing system

1.3 REFERENCES

- A. FS-HH-I-1972/GEN – Polyisocyanurate Insulation
- B. ASTM D41/D41M – Standard Specification for Asphalt Primer for Used in Roofing, Dampproofing, and Waterproofing
- C. ASTM D312 – Standard Specification for Asphalt Used in Roofing
- D. ASTM D2178/D2178 – Standard Specification for Asphalt-Impregnated Glass Felt used in Roofing and Waterproofing
- E. ASTM D2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics
- F. ASTM D4586/D4586M – Standard Specification for Asphalt Roof Cement, Asbestos Free
- G. ASTM D6164 – Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
- H. ASTM E96/E96M – Standard Test Method for Water Vapor Transmission of Materials
- I. ASTM E108 Standard Test Methods for Fire Test of Roof Coverings
- J. ASCE 7-16 – Minimum Design Loads for Buildings and Other Structures
- K. NRCA - Roofing and Waterproofing Manual, Current Edition
- L. UL - Fire Hazard Classifications
- M. UL – Roofing System & Material Guide
- N. FBC - Florida Building Code
- O. FFPC – Florida Fire Prevention Code
- P. LEED for Schools by USGBC

1.4 SUBMITTALS

- A. Product Data: Submit specifications, installation instructions, and general recommendations from manufacturers of roofing system materials, for type of roofing required.
- 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 ASCE 7-16.
 - 2. Provide a copy of product approval for the system, per FBC requirements.
- C. Samples: Submit 8" x 10" sized products.
- D. Certificates included with closeout documents:
 - 1. At completion of work, submit Manufacturers certification that roofing system installation is in accordance with Manufacturer's warranty requirements.

E. Safety Provisions:

1. Submit a complete detailed schedule of special safety provisions implemented to insure the health and safety of the people.
2. Work shall not start without the Owner's agreement of the following provisions:
 - a. A plan on how to maintain the school's existing exits and fire protection systems during construction;
 - b. A plan for the sequencing of work, including the removal of debris from the site during and after construction;
 - c. A fall protection plan indicating the contractor plans for complying with OSHA's requirements.

1.5 QUALITY ASSURANCE

A. Manufacturer:

1. Obtain primary roofing materials from a single manufacturer, with at least 10-years of documented experience in the roofing material business.

B. Installer: Shall be a Company specializing in installation of bituminous roofing, 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.

1. The job supervisor shall have minimum 5-years of documented experience in supervising projects of this size and scope.

C. All work shall conform to NRCA Roofing and Waterproofing Manual, and to manufacturers' instructions.

D. Requirements of Regulatory Agencies:

1. Underwriter's Laboratories, Inc.: Class A fire hazard classification.
2. Roofing system shall meet current ASCE 7-16 wind requirements for the roofing system.

E. Pre-Installation Conference:

1. Prior to installation of roofing system, conduct a pre-installation site conference after submittal approval.
2. Attendance: Owners Representative, Building Department Representative, Architect, Contractor, Job Superintendent, Subcontractors, and Manufacturer's Representative related to roofing work.
3. Agenda: Review project conditions, application, coordination with other work, and protection of completed roofing.

F. Inspections:

1. Provide on-site weekly inspections by Owner's representative during and after installation of roofing system.
2. Provided through the Building Department as necessary to assure proper installation of the roofing system.
3. Manufacturer's representative as necessary to supply the warranty.

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 manufacturer's requirements.
- C. Store rolled goods on end on clean raised platforms with a breathable weather protective covering, such as canvas, when stored outdoors.
- 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 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 for a period of two-years after date of Substantial Completion of the 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 Project.
 - 1. 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.
 - 2. Specifications on repair of the membrane Owner may do without voiding warranty.
 - 3. 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.
 - 4. Warranty shall include coverage up to design wind loads against damage due to wind uplift. Prefabricated coping is a requirement of the District and shall be included as part of such warranty.
- C. Provide on-site inspections by roofing manufacturer's representative during installation of roofing.
- D. Manufacturer's Certification: Submit written certification signed by manufacturer stating that the roofing system manufacturer will provide warranties and that this specification meets the requirements of the 20-year warranty.

PART 2 PRODUCTS

2.1 MODIFIED BITUMEN ROOFING SYSTEMS, 2-PLY & 3-PLY (OPTIONAL SUBSTRATES AND DECKS)

- A. Approved Manufacturers:
 - 1. Johns Manville
 - 2. Soprema Inc
 - 3. The Garland Company
 - 4. Polyglass USA
 - 5. Other pre-approved equal
- B. TWO-PLY SYSTEM over light weight concrete, structural concrete and/or metal deck,
Membrane Properties:
 - 1. One ply, modified bitumen base sheet per ASTM D6164
 - a. 3.0 mm (118 mils) minimum thickness
 - 2. One ply, modified bitumen membrane, granular surfaced, fire retardant, cap sheet, per ASTM D6164.
 - a. 4.0 mm (160 mils) nominal thickness
 - b. The cap sheet will meet the initial SRI and 3-year aged Thermal Emittance required by the green rating system, if required by the project Architect.

- c. The cap sheet will meet energy code requirements as absolute minimum criteria
 - C. THREE-PLY SYSTEM over light weight concrete, structural concrete, and/or metal deck, Membrane Properties:
 1. Anchor sheet (anchor ply), reinforced modified bitumen coated membrane, per ASTM D4601
 - a. 1.5mm (59 mils) thickness minimum
 2. One ply (interply), modified bitumen base sheet per ASTM D6164
 - a. 3.0 mm (118 mils) minimum thickness
 3. One ply, modified bitumen membrane, granular surfaced, fire retardant, cap sheet per ASTM D6164
 - a. 4.0 mm (160 mils) nominal thickness
 - b. The cap sheet will meet the initial SRI and 3-year aged Thermal Emittance required by the green rating system, if required by the project Architect
 - c. The cap sheet will meet energy code requirements as absolute minimum criteria.
 - D. COMMON ELEMENTS/COMPONENTS
 1. Roof covering shall be Class A fire rating
 2. Primer: ASTM D41/D41M
 3. Roofing Cement: ASTM D4586/D4586M, asbestos-free
 4. Mineral Granules: Size No. 11 ceramic, white in color, free of fines and dust, unaffected by airborne acids and ultraviolet radiation
- 2.2 ACCESSORIES
- A. Roof System Vents: Manufacturer's standard spun aluminum one-way venting
 - B. Cant Strip: mineral wool, modified bitumen, torch or cold adhesive applied (optional use of cant strip if approved by manufacturer)
 - C. Low Profile Roof Expansion Joint System
 - D. Walk Pads: SBS-modified bitumen ply, 5.0 mm (197 mils) minimum
- 2.3 RIGID INSULATION (OPTIONAL)
- A. Rigid Insulation: 20 psi polyisocyanurate or 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 1.5" at all roof drains shall provide a minimum insulation value as required by FBC-Energy Conservation.
 - B. Fastening Devices: Provide membrane manufacturers' insulation fastening system of appropriate size and nailing pattern as designed and tested in the Product Approval documents.
- 2.4 LIGHTWEIGHT CONCRETE INSULATION (OPTIONAL)
- A. Lightweight Concrete Insulation: cellular insulating concrete with EPS insulation board, stair stepped as required.
 1. Acceptable insulation products as manufactured by Elastizell, Celcore, Concrecel, or Mearlcrete.
 - a. Insulation thickness as shown on drawings to a minimum of 2" at all roof drains shall provide a minimum insulation value as required by FBC-Energy Conservation.
 - B. Fastening Devices: Provide membrane manufacturers' insulation fastening system of appropriate size and nailing pattern as designed and tested in the Product Approval documents.
 - C. Provide vented deck system for lightweight concrete.

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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. These items may be installed after the membrane installation only with Architect's written approval, proper provision for re-inspection, and continued warranty protection.

3.2 PREPARATION OF SUBSTRATE

- A. Insulation:
 - 1. The applicator shall carefully inspect all surfaces to receive insulation and assure all surfaces are satisfactory prior to beginning installation.
 - 2. 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 (OPTIONAL)

- A. Insulation Board:
 - 1. Mechanically fasten insulation to the metal deck to meet ASCE 7-16 wind uplift requirements.
 - 2. Adhere insulation to the structural concrete deck to meet ASCE 7-16 wind uplift requirements.
- B. Install tapered insulation boards back from roof drains for positive drainage as shown on the drawings.

3.4 LIGHTWEIGHT CONCRETE INSTALLATIONS (OPTIONAL)

- A. Slurry: Cover the metal deck with a $\frac{1}{8}$ " inch slurry coat of the lightweight insulating fill.
- B. Insulation Board: Place the insulation board in the $\frac{1}{8}$ " slurry coat.
 - 1. Place the insulation board within 30 minutes of slurry coat placement.
 - 2. Place the insulation board in a manner that provides full contact of slurry to board.
 - 3. Install the insulation board in a stair-stepped configuration to achieve the minimum $\frac{1}{8}$ " 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. Vent insulation board to roof edges as recommended by manufacturer.

3.5 INSTALLATION OF ROOFING MEMBRANE SYSTEM & RIGID INSULATION &/OR LIGHT WEIGHT CONCRETE, STRUCTURAL CONCRETE &/OR OVER METAL DECK (OPTIONAL)

- 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 two ply system, over a rigid insulation system or over a light weight concrete.
 - 1. Mechanically fasten base sheet (polyester reinforced, 118 mils (minimum) to the metal roof deck or cold applied base sheet to new or existing light weight insulative concrete
 - a. (Optional) Use ribbon applied adhesive, not to exceed 6" oc, using a polyester reinforced base sheet, 118 mils minimum.

2. Torch apply or use cold adhesive to adhere the cap sheet (polyester reinforced granular surface, 160 mils (nominal) to the base sheet.
 - a. 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.
 3. Complete application of roofing system without pockets, fish mouths, or blisters.
 4. Embed mineral roofing granules into bitumen bleeding 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.
1. Install temporary water cut-offs of plastic cement and base sheet strips at end of each day's work.
 2. 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 sf of roof area or as recommended by manufacturer.
- 3.6 INSTALLATION OF ROOFING MEMBRANE SYSTEM & LIGHTWEIGHT CONCRETE & STRUCTURAL CONCRETE DECK (OPTIONAL)
- 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 an anchor sheet and two plys, over a lightweight concrete and structural concrete deck
1. Mechanically attach the anchor sheet to the new lightweight concrete deck in a pattern to meet ASCE 7 as per manufacturer recommendations and the Product Approvals for wind uplift classification, minimum 180 mph or as specified by structural engineer.
 2. Torch apply or use cold adhesive to adhere a base sheet and a cap sheet to complete the system.
 - a. Remove the roll wrapping tape and labels before membrane installation.
 - b. Unroll first roll of membrane completely and align.
 - i) Unroll remaining rolls approximately halfway in order to align the side laps and maintain the required end lap.
 - ii) 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. Roll up the un-adhered half of the membrane sheet and repeat the above procedure to complete the installation of the roll.
 - e. Apply membrane: seal seams, ends, and permanently waterproof.
 - f. Apply membrane smooth, free from air pockets, wrinkles, or tears.
 - g. Extend membrane up cant strips a minimum of 4" onto vertical surfaces.
 - h. Seal membrane around roof penetrations.
 - i. 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.
1. Install temporary water cut-offs of plastic cement and base sheet strips at end of each day's work.
 2. 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.

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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 Light Weight Concrete: Provide aluminum one-way vent stacks for every 900 square feet of roof area or as recommended by manufacturer (when light weight concrete system not vented through metal deck).
- 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