

SECTION 07 52 00
SEBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
1. Modified bituminous membrane roofing.
 2. Base sheet flashings.
 3. Base-ply felts.
 4. Roofing insulation.
 5. Vapor Retarders.
 6. Deck Sheathing.
 7. Cant strips, accessories and roofing expansion joints.
- B. Related Sections include the following:
1. Division 6 Section 06 10 00 "Rough Carpentry" for wood blocking, curbs, cants, and nailers; and wood-based, structural-use roof deck panels.
 2. Division 7 Section 07 01 50.19 "Preparation for Re-Roofing".
 3. Division 7 Section 07 60 00 "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
 4. Division 7 Section 07 92 00 "Joint Sealants".

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms not related to roofing work not otherwise defined in this Section.
- B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mop-applied roofing asphalt and 75 centipoise for mechanical spreader-applied roofing asphalt within a range of plus or minus 25 deg F (14 deg C) measured at the mop cart or mechanical spreader immediately before application.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Install a watertight, modified bituminous membrane roofing and base flashing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.

- B. FM Listing: Provide modified bituminous membrane, base flashings, and component materials that meet requirements of FM 4450 and FM 4470 as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
 - 1. Roofing system shall comply with the following:
 - a. Fire/Windstorm Classification: Class 1A-90.
- C. Roofing System Design: Provide a roofing system that complies with roofing system manufacturer's written design instructions and with the following:
 - 1. SPRI's "Wind Design Guild for Adhered Roofing Systems"
 - a. Exposure Category: Exposure A.

1.5 SUBMITTALS

- A. Prior to starting work, the roofing contractor shall submit 3 copies of the technical data on roofing materials, including material specifications, Material Safety Data Sheets, and installation procedures.
- B. All bidders must submit the following documentation.
 - 1. A list of three (3) jobs of similar size where the proposed materials have been used, under similar conditions as specified.
 - 2. Shop Drawings:
 - a. Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
 - b. Owner will review and comment on required changes. The Contractor may make and distribute corrected copies as are required for his purposes.
 - 3. Copy of the roofing suppliers' warranty which meets all requirements of the specified warranty.
 - 4. Letter from material supplier signed by a corporate officer, on company stationery, confirming that all bidding documents have been approved, that the site has been inspected and meets the requirements for suitability, and that the specified warranty shall be provided upon satisfactory completion of the project.
 - 5. Material supplier providing the roofing warranty shall be ISO 9001: 2000 Certified.
 - a. Submit a copy of the material suppliers ISO 9001: 2000 Certificate of Registration.

- b. Certificate of Registration shall have listed: Design, Manufacturer and Distribution in the Scope of Approval and/or Activity.
- C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to receive the standard roofing manufacturer's warranty.
- D. Manufacturer Certificates: Signed by roofing system manufacturer certifying that the roofing system complies with requirements specified in the "Performance Requirements" Article. Upon request, submit evidence of complying with requirements.
- E. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- F. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of components of roofing system with requirements based on comprehensive testing of current product compositions.
 - 1. Indicate compliance of bulk roofing asphalt materials delivered to Project with requirements. Include quantity and statistical and descriptive data for each product. Submit certificate with each load before it is used.
 - 2. Include continuous log showing time and temperature for each load of bulk bitumen, indicating date obtained from manufacturer, where held, and how transported before final heating and application on roof.
- G. Research/Evaluation Reports: Evidence of roofing system's compliance with building code in effect for Project from a model code organization acceptable to authorities having jurisdiction.
- H. Maintenance Data: For roofing system to include in the maintenance manuals specified in Division 1.
- I. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roof installation.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing similar to that required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's

product; and who is eligible to receive the standard roofing manufacturer's warranty.

- B. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
 - 1. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108, for application and slopes indicated.
- C. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Meet with the same participants and review the same items listed for the preinstallation conference. In addition, review status of submittals and coordination of work related to roof construction. Notify participants at least 5 working days before conference.
- D. Preinstallation Conference: Before installing roof system, conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings". Notify participants at least 5 working days before conference.
 - 1. Meet with Owner; Architect; Owner's insurer, if applicable; testing and inspecting agency representative; roofing installer; roofing system manufacturer's representative; deck installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment, if applicable.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
 - 4. Review loading limitations of deck during and after roofing.
 - 5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
 - 6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
 - 7. Review temporary protection requirements for roofing system during and after installation.

8. Review roof observation and repair procedures after roofing installation.
9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

E. Manufacturer's Inspections:

1. The roofing systems manufacturer shall provide daily jobsite inspections with weekly written reports, progress reports with photographs of work in progress. One manufacturer's representative shall provide all inspections.
2. Confirm, whenever called upon by the Architect or Owner, that no application procedures were in conflict with the published specifications other than those that may have been previously reported and corrected.
3. Inspections: Performed only by a full time employee of the roofing system manufacturer. The representative has been in the employ of the manufacturer a minimum of 5 years and lives within 50 mile radius of the jobsite.
4. The roofing system manufacturer will provide inspections of the roofing system, whenever called upon by the Architect or Owner, for the duration of the delivered warranty period.
5. Manufacturer will attend preconstruction meeting and attend all weekly jobsite meetings.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Store roofing materials in a dry, well-ventilated, weathertight location to ensure no significant moisture pickup and maintain at a temperature exceeding roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
 1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.
- B. Do not leave unused felts and other sheets materials on the roof overnight or when roof work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F (10 deg C).
- C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- D. Protect roofing 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.

1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Existing roofing manufacturer's warranty maintains existing roofing manufacturer's warranty.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with Quality Control, References, Specification, and Manufacturer's data. Where conflict may exist, requirements that are more stringent govern.
- B. Provide primary products, including each type of roofing sheet (felt), bitumen, base flashings, miscellaneous flashing materials, and sheet metal components from a supplier/manufacturer, which has produced that type of product successfully for not less than three (3) years. Provide secondary products (insulation, mechanical fasteners, lumber, and etc.) only as recommended by the warrantor of primary products for use with roofing system specified.

2.2 SYSTEM ROOFING MATERIALS

- A. Roof System Description:
1. A hot-applied roof system designed for exceptional performance and sustainability. This minimum 145 mil SEBS fire-rated, granule surfaced system combines premium quality components for optimum rooftop weatherability, endurance and value. Formulated with a unique blend of high quality asphalt and polymer modifiers specifically selected to complement premium reinforcements, this roof system is engineered to provide long-term performance.
- B. Roof Systems Materials

Test	Typical Value	Test Method
Tensile Strength at Maximum Load,	375 lbf/in. MD	ASTM D 2523
0°F±3.6°F (-18±2°C), lbf/in.	290 lbf/in. XMD	
Elongation at Break, 73.4±3.6°F	4.0% MD	ASTM D 2523

(23±2°C), %	4.0% XMD	
Fire Resistance	Pass, Class "A"	UL 790 / ASTM E 108
Minimum No. of Reinforcing Plies	Three	ASTM D 2829
System Surfacing Ply Granule Embedment	≤1.3 gram	ASTM D 4977
Testing		
Hail Resistance (Material must be weathered for 1000 hrs. in a fluorescent ultraviolet condensation type weathering apparatus before testing for hail resistance.)	Pass - Severe hail resistance	FM 4470
Wind Uplift Resistance (Reference Hickman FM listings for specific construction)	Steel Deck = 1-150 psf Concrete Deck = 1-375 psf	FM 4470
Waterproofing Integrity (Water Leakage Test)	No sign of water leakage during 7-day period or during or after the pressure cycles	FM 4470
Resistance to Foot Traffic	No sign of tearing or cracking	FM 4470
System Testing for Asbestos Content, %	Zero EPA/600/R-93/116	

C. Related Roof System Materials

Asphalt Primer:

Test	Typical Value	Test Method
Asbestos Content	0%	EPA/600/R-93/116
Viscosity	30 -60 cps	ASTM D 2196
Density	7.2 lbs/gal.	ASTM D 1475
Solids by Weight	43%	ASTM D 4479
Flash Point	101°F minimum	ASTM D 93

Asphalt Mastic:

Test	Typical Value	Test Method
Asbestos Content	0%	EPA 600/R-93/116
Non-Volatile Matter by Weight	76-82%	ASTM D 4586
Viscosity @ 77°F	450,000-950,000 cps	ASTM D 2196
Density @ 77°F	9.5-10.0 lb/gal.	ASTM D 1475
Resistance to Sag @ 140°F	1/8" maximum	ASTM D 4586
Adhesion to Wet Surfaces	55%	ASTM D 3409
Moisture by Weight	1.5%	ASTM D 4586
Mineral or Other Stabilizers by Weight	38%	ASTM D 4586
Asphalt by Weight	40%	ASTM D 4586
Uniformity & Workability	Acceptable as described	ASTM D 4586
Behavior @ 140°F	No blistering	ASTM D 4586
Pliability @ 32°F	No cracking/separation	ASTM D 45

2.3 AUXILIARY MEMBRANE MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with SEBS-modified bituminous roofing.
 - 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Asphalt Primer: ASTM D 41.
- C. Roofing Asphalt: ASTM D 312, Type IV; for adhering insulation, use Type III.
- D. Metal Flashing Sheet: Metal flashing sheet is specified in Division 7 Section "Sheet Metal Flashing and Trim".
- E. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section "Rough Carpentry".
- F. Wood Cants: Furnish wood cants complying with requirements of Division 6 Section "Rough Carpentry" in locations indicated on the drawings.
- G. Cants: Cellulosic-fiber board, complying with ASTM C 208, Type 2.
- H. Glass-Fiber Fabric: Woven glass cloth, treated with asphalt; complying with ASTM D 1668, Type 1.
- I. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

2.4 BASE-PLY SHEET

- A. Base Sheet: Fiberglass base sheet complying with ASTM D 4601.

2.5 INSULATION MATERIALS

- A. General: Provide preformed, roofing insulation boards that comply with requirements, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation complying with ASTM C 1289, classified by facer type as follows:
 - 1. Polyisocyanurate insulation board with Type II, felt or glass-fiber mat in both sides. Base layer will be 2.0 thick as specified. Additional layers will be 2.0 thick as specified. Entire roof system will be two layers of 2 inch material in each layer for a total of 4 inch minimum insulation thickness unless indicated otherwise on the drawings.
- C. Cover Board Insulation: Rigid, mineral-aggregate thermal insulation board consisting of expanded perlite, cellulose fibers, binders and waterproofing agents with top surface seal-coated, complying with ASTM C 728. Minimum thickness will be 1/2".

2.6 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

2.7 COATING MATERIALS

- A. Roof Coating: ASTM D 2824, Type III, Aluminum coating; fibered, without asbestos.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.
- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.
 - 1. Verify that wood nailer strips are located perpendicular to roof slope and are spaced according to requirements of roofing system manufacturer.
- D. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.5 mm) out of plane.
- E. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Tear off existing roof system down to existing metal roof deck at locations of new roof penetrations. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install modified bituminous membrane roofing system according to roofing system manufacturer's written instructions and applicable recommendations of NRCA/ARMA's "Quality Control Recommendations for Polymer Modified Bitumen Roofing".

1. Install roofing system according to applicable specification plates of NRCA's "The NRCA Roofing and Waterproofing Manual".
- B. Start installation of modified bituminous membrane roofing in presence of roofing systems manufacturer's technical personnel.
- C. Shingling Plies: Install modified bituminous membrane roofing system with ply sheets shingled uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water.
 1. Where roof slope exceeds 1/2 inch per 12 inches (1:24), run sheets of modified bituminous membrane roofing parallel with slope. Backnail top ends of sheets to nailer strips.
- D. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of modified bituminous membrane roofing system with vertical surfaces or angle changes greater than 45 degrees.
- E. Cooperate with inspecting and testing agencies engaged or required to perform services for installing modified bituminous membrane roofing system.
- F. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
 1. Provide cutoff's at end of each day's work to cover exposed ply sheets and insulation with a course of coated felt 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 roofing asphalt and apply within plus or minus 25 deg F (14 deg C) of equiviscous temperature, unless otherwise required by roofing system manufacturer. Do not raise roofing asphalt temperature above the equiviscous temperature range more than one hour before time of application. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Do not heat roofing asphalt within 25 deg F (14 deg C) of flash point. Discard roofing asphalt maintained at a temperature exceeding 500 deg F (260 deg C) for more than 4 hours. Keep kettle lid closed, unless adding roofing asphalt.
 1. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

3.4 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
- C. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces as required.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Stagger insulation joints of previous layer at minimum of 6 inches (150 mm) in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain. Minimum thickness of tapered insulation at roof drain bodies is 2 inches within a 4 feet radius of each roof drain. Balance of roof insulation is minimum 4 inches thick.
- F. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

3.5 BASE-PLY FELT INSTALLATION

- A. Install base-ply felts according to roofing system manufacturer's written instructions, starting at low point of roofing system. End lap and shingle each base-ply felt to ensure number of base-ply felts covers the substrate at any point. Extend base-ply felts over and terminate beyond cants. Embed each base-ply felt in a continuous mopping of hot roofing asphalt, to form a uniform membrane without base-ply felts touching each other.
 - 1. Install two base felts in Type III asphalt.

3.6 ROOF MEMBRANE INSTALLATION

- A. General: Install modified bituminous membrane over area to receive roofing, according to manufacturer's written instructions. Extend modified bituminous membrane over and terminate beyond cants.
 - 1. Unroll sheet and allow it to relax for the minimum time period required by manufacturer.
- B. Single-Ply Modified Bituminous Membrane: Install a single ply of modified bituminous membrane starting at low point of roofing system.
 - 1. Application: Adhere to substrate in a solid mopping of hot roofing asphalt applied at rate required by roofing system manufacturer.

- C. Laps: Accurately align 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.
- D. Install modified bituminous membranes with side laps shingled with slope of roof deck where possible.
 - 1. Install modified bituminous membranes with side laps shingled in direction to shed water on each large area of roofing, where slope exceeds 1/2 inch per 12 inches (1:24).
- E. INSTALL TWO PLY BASE FELTS AND MODIFIED BITUMEN THE SAME DAY. NO PHASED APPLICATION WILL BE ACCEPTED ON THIS PROJECT.
- F. Embed granules in asphalt bitumen outflow at laps of mineral surfaced sheet.

3.7 FLASHING AND STRIPPING INSTALLATION

- A. Install modified bituminous membrane base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:
 - 1. Prime substrates with asphalt primer if required by roofing system manufacturer.
 - 2. Backer Sheet Application: Install one ply of backer felt and adhere to substrate in a uniform mopping of hot roofing asphalt.
 - 3. Base Flashing Application: Adhere modified bituminous membrane base flashing to substrate in a uniform mopping of hot roofing asphalt, applied to substrate and back of base flashing at rate required by roofing system manufacturer.
- B. Extend base flashing up the wall a minimum of 8 inches (200 mm) above roof membrane and 4 inches (100 mm) onto field of roof membrane unless shown otherwise on the drawings.
- C. Mechanically fasten top of modified bituminous membrane base flashing securely at terminations and perimeter of roofing.
 - 1. Nail all vertical flashings six inches on center using simplex fasteners.
 - 2. Strip in vertical seams with 6 inch fiberglass mesh and mastic three course.
 - 3. Strip in top of vertical base flashings with 3 inch fiberglass mesh and mastic three course.
- D. Install modified bituminous stripping where metal flanges are set on membrane roofing, seal outside edges of all membrane stripping at metal

flanges with elastomeric caulking according to roofing system manufacturer's written instructions.

- E. Roof Drains: Set 30-by-30-inch (760-by-760-mm) 2 lb copper metal flashing in bed of asphalt roofing cement on completed modified bituminous membrane roofing. Cover metal flashing with modified bituminous stripping extending a minimum of 4 inches (100 mm) beyond edge of metal flashing onto field of roof membrane. Clamp roof membrane, metal flashing, and stripping into roof-drain clamping ring.

3.8 COATING INSTALLATION

- A. Apply coatings according to manufacturer's written instructions, by spray, roller, or other suitable application method, to the following locations:
 - 1. Coat with fibered aluminum all three course strip-in on membrane flashings.

3.9 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect and Owner 48 hours in advance of the date and time of inspection.

3.10 PROTECTING AND CLEANING

- A. Protect modified bituminous membrane roofing 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 modified bituminous roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the 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.

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