

SECTION 07 52 16
STYRENE-BUTADIENE-STYRENE MODIFIED BITUMINOUS MEMBRANE
ROOFING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies cold adhesive or self adhered modified bituminous sheet roofing and base flashing installed on new construction with granular surface.
- B. Temporary roofs.
- C. Repairs and alteration work.

1.2 RELATED WORK:

- A. Wood cants, blocking and wood edge strips: Section 06 10 05, MISCELLANEOUS CARPENTRY.
- B. Sheet metal components: Section 07 60 00, FLASHING AND SHEET METAL.
- C. Section 07 14 00 – FLUID APPLIED ROOFING SYSTEM: Roofing system applied over concrete substrate.

1.3 QUALITY CONTROL:

- A. Supervision of work by persons those are knowledgeable and experienced in roofing.
- B. Unless specified otherwise, comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to modified bituminous sheet roofing for storage, handling and application.
- C. Applicator licensed by manufacturer.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Adhesive Modified Bituminous Sheet Roofing.
 - 2. Roofing cement.
 - 3. Fastening requirements.
 - 4. Application instructions.

- C. Samples:
 - 1. Nails and fasteners, each type.
 - 2. Cutout samples in plastic bag after testing.
- D. Certificates: Indicating materials and method of application of roofing system meets requirements of Factory Mutual Research Corporation for wind uplift requirements.
- E. Warranty: As specified.
- F. Laboratory Testing Reports: Roofing cutouts.
- G. Documentation of supervisors training and experience showing knowledge of roofing procedure.

1.5 DELIVERY, STORAGE AND MARKING:

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer or seller.
- B. Keep materials dry, and store in dry, weathertight facilities or under canvas tarps. Use of polyethylene or plastic tarps to cover materials is not permitted:
 - 1. Store above ground or deck level on wood pallets. Cover ground under pallet stored materials with plastic tarp.
 - 2. Store rolled materials on end. Do not store materials on top of rolled materials.
- C. Protect from damage from handling, weather and construction operations before, during, and after installation.

1.6 WARRANTY:

- A. Warranty: Manufacturer's standard 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. Failure includes roof leaks.
 - 1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, fasteners and other components of membrane roofing system.
 - 2. Warranty Period: 15 years from date of Substantial Completion.

B. Installation Guarantee:

1. Contractor shall guarantee the roofing and associated work, including, but not limited to, all flashing and counterflashing, both composition and metal, roof decking and/or sheathing, all materials used as a roof substrate or insulation over which roof is applied; metal work, gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship.
2. Contractor shall guarantee that Contractor will, at Contractor's own expense, make or cause to be made such repairs to, or replacements of said work, by a roofing contractor approved and certified by the manufacturer to install the accepted roofing system, in accordance with the roofing manufacturer's standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with the construction documents as are necessary to maintain said work in satisfactory condition, and forth, to respond on or within 3 calendar days upon proper notification of leaks or defects by the Owner or Architect.
3. This guarantee is limited to the work performed by the Contractor and does not extend to: alterations or additions to the roof performed by other contractors, damage caused by lightning, windstorm, hailstorm and other unusual phenomena of the elements, or fire, damage to the interior contents of the building such as furniture and files not attached to the building, and damage or abuse of the work caused by others not associated with the Contractor.
 - a. Warranty Period: 2 years from date of Project Substantial Completion.

1.7 APPLICABLE PUBLICATIONS:

- A. Publications listed below form a part of this specification to the extent referenced.
Publications are referenced in the text by the basic designation only.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

- C. Federal Specifications (Fed. Spec.):
 - UU-B-790A.....Building Paper, Vegetable Fiber: (Kraft,
 - INT AMD 1.....Waterproofed, Water Repellent and Fire Resistant
- D. American Society for Testing and Materials (ASTM):
 - D6162.....Styrene Butadiene Styrene (SBS) Modified Bituminous
Sheet Materials Using a Combination of Polyester and
Glass Fiber Reinforcements
 - D6163.....Styrene Butadiene Styrene (SBS) Modified Bituminous
Sheet Materials Using Glass Fiber Reinforcements
 - D6164.....Styrene Butadiene Styrene (SBS) Modified Bituminous
Sheet Materials Using Polyester Reinforcements
- E. Factory Mutual Engineering and Research Corporation (FM):
 - Annual issue.....Approval Guide Building Materials.
- F. Underwriters Laboratories, Inc. (UL):
 - Annual issue.....Building Materials Directory
 - Annual issue.....Fire Resistance Directory
- G. Warnock Hersey (WH):
 - Annual issue.....Certification Listings
- H. National Roofing Contractors Association (NRCA): The NRCA Roofing and
Waterproofing Manual – Fifth Edition.

PART 2 - PRODUCTS

2.1 ROOFING MATERIALS:

- A. Roof Cement: ASTM D4586, Type I or Type II.
- B. Modified Asphalt Sheet:
 - 1. Adhesive applied membrane composed primarily of SBS modified asphalt material fabricated in sheet form and designed for roofing exposed to the weather.
 - 2. Reinforced sheet with glass fiber, polypropylene, or polyester fabric or felt, at manufacturers' option.

3. Use mineral granular surfaced top sheet minimum thickness 4 mm (150 mils). Use 3 mm (120 mils) minimum thick smooth top sheet when aluminum pigmented coating is specified. Use 3 mm (120 mils) minimum thick smooth base sheet.
4. Provide the sheet with a release sheet to prevent bonding of the sheet to itself.
5. ASTM D6162, Type II, Grade G or S; ASTM D 6163, Type II, Grade G or S; ASTM 6164, Type II, Grade G.

2.2 FASTENERS:

- A. Nails for securing built-up flashing and base sheets to wood nailers and deck:
 1. Zinc coated steel roofing nails with minimum head diameter of 10 mm (3/8-inch) through metal discs at least one inch across.
 2. Nails with an integral flat cap at least 24 mm (15/16-inch) across.
- B. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.

2.3 COVER BOARD

- A. Cover Board: Glass Mat Gypsum Board with coating to receive adhesive.
 1. Acceptable Product: Dens Deck Prime, or approved equal.
 2. Board Size: 4' x 8' rigid boards.
 3. Thickness: 5/8 inch

PART 3 - EXECUTION

3.1 GENERAL:

- A. Do not apply if deck will be used for subsequent work platform, storage of materials, or staging or scaffolding will be erected thereon unless system is protected.
- B. Phased construction is not permitted. The complete installation of roofing system is required in the same day except for area where temporary protection is required when work is stopped. Complete installation includes pavers and ballast for ballasted systems.
- C. Entire roof deck construction of section of the building shall be completed before roofing work is begun:

1. Install curbs, blocking, edge strips, cants, and other components where insulation, roofing and base flashing is attached to, in place ready to receive insulation and roofing.
 2. Coordinate roof operations with roof insulation and sheet metal work so that insulation and flashings are installed concurrently to permit continuous roofing operations.
- D. Apply dry roofing materials.
- E. Dry out surfaces, including the flutes of metal deck that become wet from any cause during progress of the work before roofing work is resumed. Apply materials to dry substrates.
- F. Except for temporary protection, do not apply materials during damp or rainy weather, during excessive wind conditions, nor while moisture (dew, snow, ice, fog or frost) is present in any amount in or on the materials to be covered or installed:
1. Do not apply materials when the temperature is below 10 °C (50 degrees F).
 2. Do not apply materials to substrate having temperature of 10 °C (50 degrees F) or less.
- G. Phased construction is not permitted. Complete roofing membrane in the same day, including insulation, base flashings, and stripping except for the area where temporary protection is required when work is stopped.
- H. Temporary Protection:
1. Install temporary protection consisting of glaze coats and water cut offs at the end of day's work and when work is halted for an indefinite period or work is stopped when precipitation is imminent.
 2. Glaze coat exposed surfaces of felts to seal within the bitumen coating. Do not leave felt surfaces or edges exposed.
 3. Install temporary cap flashing over the top of base flashings where permanent flashings are not in place to provide complete protection against moisture entering the roof system through or behind the base flashing. Securely anchor in place to prevent blow off and damage by construction activities.
 4. Provide for removal of water or drainage of water away from the work.

5. Provide temporary protection for roofing by means of duckboard walkways, plywood platforms, or other materials, as approved by Resident Engineer, for roof areas that are to remain intact, and that are subject to foot traffic and damage. Provide notches in sleepers to permit free drainage.

3.2 SURFACE PREPARATION:

- A. Sweep decks to broom clean condition. Remove all dust, dirt or debris.
- B. Remove projections that might damage materials.

3.3 COVER BOARD INSTALLATION

- A. Install cover boards over metal deck with long joints in continuous straight lines at perimeter of roofing and at additional locations indicated on Drawings. Install in the same direction as the insulation boards.
- B. Stagger joints from joints in insulation below a minimum of 6 inches in each direction.
- C. Loosely butt cover boards together and fasten through the insulation into the metal deck.
- D. Adhere or fasten according to manufacturer's recommendations and the requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
- E. Tape joints if required by roofing system manufacturer.

3.4 INSTALLATION OF MODIFIED BITUMEN MEMBRANE:

- A. General:
 1. Where nailers occur at roof edges under gravel stops or penetrations to receive metal base flashing, nail a continuous strip of 400 mm (16-inch) wide dry organic felt envelope over the nailers before the first ply sheet is applied. After membrane is installed, turn the dry felt back over the roofing, and secure in place with adhesive before gravel stops or other metal flanges extending out onto the membrane are installed.
 2. Where cants occur at vertical surfaces, cut off roofing sheets two inches above top of cant strips, except at prefabricated curbs, scuttles and other roof accessories having integral cants, extend membrane over cant and up vertical surface to top of curb or nailer as shown.
 3. Where reglet occurs at vertical surfaces, extend plies roofing sheets up into reglet the full depth of the reglet.

B. Roofing on Insulation:

1. Top Sheet: Install modified bituminous roofing membrane [sheet and]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:
 - b. Adhere to substrate in cold-applied adhesive.
 - b. If required by manufacturer, unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer..
2. 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. Repair tears and voids in laps and lapped seams not completely sealed.
3. Install roofing membrane sheets so side and end laps shed water.

3.5 BASE FLASHING:

- A. Provide built-up base flashing over cants and as necessary to make work watertight.
- B. Apply flashing on top of roofing, up face of cant and up the face of the vertical surface, at least 200 mm (eight inches) above the roofing but not more than 350 mm (14 inches) above the roofing, generally full height beneath counter flashing or top of curb flashing.
 1. At reglet, extend full depth into the reglet.
- C. Use two plies of modified bituminous sheet.
 1. Extend the first ply 100 mm (four inches) out on the roofing, and the second ply 75 mm (three inches) beyond the first ply. Lap ends 75 mm (three inches) with joints broken 450 mm (18 inches) in each ply. Use smooth surface modified bituminous sheet for first ply.
 2. Use granular surfaced modified bitumen cap sheet.
- D. Adhere base flashing with adhesive approved by manufacturer.
 1. Except for venting roof edges, seal the top edge of the base flashing with roof cement.
- E. Secure top edge of base flashing with nails on a line approximately 25 mm (one inch) below top edge, spaced not more than 200 mm (eight inches) on center.
 1. Cover nail heads with roof cement.

2. Cover the top of the base flashing with counterflashing as specified in Section 07 60 00, FLASHING AND SHEET METAL. At the fascia cants secure the top edge of the flashing with fascia compression clamp as specified in Section 07 60 00, FLASHING AND SHEET METAL.

3.6 STRIPPING:

- A. Coordinate to set flanges of metal flashing in roof cement on top sheet of the modified bituminous roofing and mailing to blocking with Section 07 60 00, FLASHING AND SHEET METAL.
- B. Cover that portion of the horizontal flanges of metal base flashings, gravel stops, and other flanges extending out onto the roofing with modified bituminous sheet.
- C. Extend the sheet out on the roofing 150 mm six inches beyond the edge of the metal flange. Cut edge to fit tight against vertical members of flange.

3.7 CUTOUTS AND EXAMINATION ON NEW ROOFS:

- A. Make one cutout for each 400 m² (4300 square feet) of roof area or fraction thereof and for each days work in accordance with ASTM D3617.
- B. Alternately cut one specimen 300 mm x 300 mm (12 inches by 12 inches) and then cut one sample 100 mm x 1000 mm (4 inches by 40 inches) including the insulation down to the vapor retarder.
- C. Cuts shall be made in the presence of the Resident Engineer, at the locations directed by the Resident Engineer/COTR.
- D. Immediately restore and repair areas of test cuts as specified with new materials.
- E. Include comments and evaluation on moisture found in membrane and insulation, presence of foreign material, voids, and lack of bond between sheets and insulation plies in inspection report.
- F. If examination shows that roofing does not conform to specifications, rectify the deficiency to insure a roof equal to that specified.
 1. Remedial measures required at no additional cost to the Government.
 2. Moisture, voids, and lack of adhesion found in roof system require removal and replacement.

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