

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

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies modified bituminous sheet roofing and base flashing installed on existing construction with granular or coated surface.
- B. Repairs and alteration work.

1.2 RELATED WORK:

- A. Wood cants, blocking and wood edge strips: Section 06 10 00, ROUGH CARPENTRY.
- B. Sheet metal components: Section 07 60 00, FLASHING AND SHEET METAL.

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.
- D. Perform roof alteration work so as to maintain existing roof warranty.

1.4 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Asphalt materials.
 - 2. Modified bituminous sheet roofing.
 - 3. Roofing cement.
 - 4. Fastening requirements.
 - 5. Application instructions.
- C. Samples:
 - 1. Nails and fasteners, each type.
- D. Warranty: As specified.
- E. 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:

Roofing work subject to the terms of the Article "Warranty of Construction", FAR clause 52.246-21.

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. Federal Specifications (Fed. Spec.):
 - UU-B-790A.....Building Paper, Vegetable Fiber: (Kraft, INT AMD 1 Waterproofed, Water Repellent And Fire Resistant)
- C. American Society for Testing and Materials (ASTM):
 - C90-06.....Load Bearing Concrete Masonry Units.
 - D41-05.....Asphalt Primer Used in Roofing, Dampproofing and Waterproofing
 - D226-06.....Asphalt-Saturated Organic Felt Used in Roofing Waterproofing
 - D312-00.....Asphalt Used in Roofing
 - D3617-07.....Sampling and Analysis of New Built-up Roof Membranes
 - D4586-07.....Asphalt Roof Cement, Asbestos Free
 - D4897-01.....Asphalt Coated Glass Fiber Venting Base Sheet Used in Roofing
 - D6162-00.....Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements
 - D6163-00.....Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements

D6164-05.....Styrene Butadiene Styrene (SBS) Modified
 Bituminous Sheet Materials Using Polyester
 Reinforcements

- D. Factory Mutual Engineering and Research Corporation (FM):
 Annual issue.....Approval Guide Building Materials.
- E. Underwriters Laboratories, Inc. (UL):
 Annual issue.....Building Materials Directory
 Annual issue.....Fire Resistance Directory
- F. Warnock Hersey (WH):
 Annual issue.....Certification Listings
- G. National Roofing Contractors Association (NRCA):
 The NRCA Roofing and Waterproofing Manual - Fifth Edition.

PART 2 - PRODUCTS

2.1 ASPHALT MATERIALS:

- A. Primer: ASTM D41.
- B. Organic Felt: ASTM D226, Type I, 7 Kg 15 lb., perforated.
- C. Asphalt: ASTM D312, Type III or IV for roof membrane.
- D. Venting Asphalt Base Sheet: ASTM D4897, Type II.
- E. Roof Cement: ASTM D4586, Type I or Type II.
- F. Modified Asphalt Sheet:
 - 1. A hot mop 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).
 - 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.
- G. Building Paper (Sheathing Paper):
 - 1. Fed. Spec. UU-B-790, Type I, Barrier paper, Grade D, Water-Vapor permeable, Style 1a, Uncreped, not reinforced; or, Style 1b, Uncreped, not reinforced; red rosin sized.
 - 2. Weighing approximately 0.3 Kg/m² (six pounds per 100 square feet.).

2.2 FASTENERS:

- A. Nails for securing built-up flashing and base sheets to wood nailers:

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. Fasteners for securing building paper and dry felt edge strips to wood nailer:
 1. Zinc coated steel roofing nails, 16 mm (5/8-inch) minimum head diameter.
 2. Flat top crown, zinc coated.
- C. Nails for Plywood:
 1. Use annular thread type and length to penetrate plywood at least 19 mm (3/4-inch).
 2. Through flat cap at least 24 mm (15/16-inch) across.
- D. Nails for Securing Venting Base Sheet to Insulating Concrete:
 1. Self-clinching type of galvanized steel having an integral flat cap at least 25 mm (1-inch) across.
 2. Nail holding power of not less than 27 Kg (60 pounds) when pulled from approximate 400 Kg/m³ (26 pound per cubic foot) dense concrete.
- E. Nails for Securing Base Sheet to Poured Gypsum Roof Deck:
 1. Special shaped nail providing diverging or hooking point.
 2. Nail with flat cap not less than 30 mm (1-1/4 inch) across.
 3. Nail holding power of not less than 18 Kg (40 pounds) per fastener.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Phased construction is not permitted. The complete installation of roofing system alterations is required in the same day.
- B. Entire roof deck construction of section of the building shall be completed before roofing work is begun:
 1. Install curbs, blocking, 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.
- C. Apply dry roofing materials.
- D. 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.
- E. 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.

F. Heating Bitumen:

1. Heat the asphalt to the equiviscous temperature plus or minus -4°C (25 degrees F) at the time of application:
 - a. Do not heat asphalt greater than 38°C (100 degrees F) above the equiviscous temperature.
 - b. When the equiviscous temperature is not furnished by the asphalt manufacturer, do not heat asphalt above 275°C (525 degrees F) for Type III and IV with temperature not less than 250°C (475 degrees F) at time of application.
2. Do not heat bitumen above the flash point temperature.
3. Provide heating kettles with a thermometer kept in operating condition. Attend kettle during heating to insure that the bitumens are heated within the temperatures specified.
4. Use type III and Type IV asphalt between plies.
5. Do not mix different type of asphalt in kettle.

G. Application of Materials with Hot Bitumen:

1. Apply bitumen in quantities required, immediately followed by membrane materials embedded therein before bitumen cools below the application temperature limit.
 - a. Do not apply more material than can be covered at one time except for glaze coats.
 - b. Recoat cooled bitumen areas.
2. Roll sheets into bitumen brushing down to firmly embed in the hot bitumen free of wrinkles, fish mouths, blisters, bubbles, voids, air pockets or other defects that prevent complete adhesion:
 - a. Lap sheets shingle fashion starting with starter strips at right angles to slope of roof.
 - b. Commence the laying of sheets at the low points.
3. Separate sheets or substrate so that subsequent plies do not touch previous placed sheets or substrate unless noted specifically.
4. Cut to fit closely around pipes, roof drains, bitumen stops, and similar roof projections.

5. Do not walk on roofing until bitumen has cooled hard and is not tacky.

H. Laps for Top Sheet and Base Sheet:

1. Base sheet, lapped 75 mm (three inches).
2. Use 450 mm (18 inch) starting widths, lap top sheet 475 mm (19 inches).
3. Lap end joints of sheet 150 mm (six inches). Stagger end joints in relation to end joints in adjacent and proceeding plies.

I. Primer Use 4L/m² (one gallon of primer per 100 square feet) of surface area.

J. Quantities of Asphalt:

1. Per square unless otherwise specified.
2. Between substrate and sheets: 7 to 11 Kg (15 to 25 pounds).
3. Glaze Coats: 7 to 11 Kg (15 to 25 pounds).

K. Nailing or Anchorage of Sheets to Nailable Decks:

1. Use nails or fasteners appropriate for type of deck.
 - a. Nail down along bottom edges at intervals not to exceed 225 mm (nine inches).
 - b. Nail down through last 475 mm (19-inch) wide sheet to both edges at intervals not to exceed 225 mm (9-inches).
 - c. Stagger nails down center of sheet in two rows 280 mm (11 inches) apart at intervals of not more than 450 mm (18 inches) in each row.
 - d. Nail to edge blocking at not more than 225 mm (9 inches) on center.

3.2 SURFACE PREPARATION:

A. Existing Modified Bituminous Roofs and Repair Areas:

1. At areas to be altered or repaired, remove loose, damaged, or cut sheet that is not firmly adhered only where new penetrations occur or repairs are required.
2. Cut and remove existing roof membrane for new work to be installed. Clean cut edges and install a temporary seal to cut surfaces. Use roof cement and one layer of 7 Kg (15 pound) felt strip cut to extend 150 mm (6 inches) on each side of cut surface. Bed strip in roof cement and cover strip with roof cement to completely embed the felt.
3. At modified bituminous base flashing to be repaired, either bend up cap flashing or temporarily remove cap flashing. Brush and scrape away all deteriorated sheets or surface material of base flashing.

3.3 BASE FLASHING:

- A. Provide built-up base flashing over cants and as necessary to make work watertight.
- B. Prime vertical surfaces of masonry and concrete with asphalt primer except where vented base sheet is required to provide edge venting.
- C. 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. Where venting base sheet is used with insulating concrete, do not seal edges of venting base sheet with bitumen; allow for venting. //
- D. 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.
- E. Set base flashing either in Type III or IV asphalt.
 - 1. Embed each sheet in asphalt so sheets do not touch.
 - 2. Set cap sheet in hot bitumen with laps sealed with hot bitumen.
 - 3. Except for venting roof edges, seal the top edge of the base flashing with roof cement.
- F. 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.

3.4 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.

D. Prime flange before stripping, embed sheet in hot bitumen.

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