

SECTION 07 51 26

BUILT-UP BITUMINOUS ROOFING

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Provision of patching existing built-up bituminous roofing system.
- B. Related Sections:
 - 1. Section 07 62 00 - Sheet Metal Flashing and Trim: Flashings other than composition roofing type.

1.02 REFERENCE STANDARDS

- A. ASTM International:
 - 1. ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - 2. ASTM D312 - Standard Specification for Asphalt used in Roofing.
 - 3. ASTM D1668 - Standard Specification for Glass Fabrics (Woven and Treated) for Roofing and Waterproofing.
 - 4. ASTM D1863 - Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
- B. CBC - California Building Code.
- C. National Roofing Contractors Association
 - 1. NRCA - The NRCA Roofing and Waterproofing Manual.

1.03 SYSTEM DESCRIPTION

- A. Design Criteria:
 - 1. Meet requirements of CBC Chapter 15.
 - 2. Comply with recommendation of NRCA, including any condition not indicated on the Drawings.
 - 3. Built-up bituminous roofing system shall be compatible with and match the existing built-up roofing system.
 - 4. Built-up bituminous roofing shall prevent water or moisture from penetrating any area of roofing application.
 - 5. Flashings shall not depend solely upon mastic or sealant for primary waterproof protection.
 - 6. All drainage to flow off roof, do not permit standing water.
 - 7. [Patch existing roofing using cold applied adhesives and cements. Hot asphalt is not permitted.]
- B. Roofing work includes, but not limited to:
 - 1. Flashing installation at new penetrations.
 - 2. Repair of damaged or deteriorated flashing.
 - 3. Install fill insulation where needed, two plies of base sheet and modified cap sheet per detail.
 - 4. All flashings to consist of one ply of base sheet set in mastic covered by an additional layer of modified bitumen membrane.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate Work with installation of associated roof penetrations and counterflashing as Work of this section proceeds.
 2. Coordinate work of this Section with related work as required avoiding delays and preventing omission of related work required for correct installation.
- B. Preinstallation Meeting:
1. Contractor shall arrange meeting to review built-up bituminous roofing work after review of submittals and prior to delivering any material to site.
 2. Meeting to be attended by University's Representative, University's Inspector of Record, Contractor, and Contractor installer, agents of accepted manufacturers, sheet metal installer, installers of other work in and around roofing that must precede, follow, or penetrate roofing (including Mechanical and Electrical Installers as applicable).
 3. Participants shall have had at least one week's advance notice of meeting date and time.
 4. Hold meeting at the job site.
 5. The following major considerations shall be reviewed at the meeting:
 - a. Review in detail the Contract specifications, roof plans, roof decks, surface preparation, slopes, [quantity and location of roof vents,] drainage, flashing details, and other related roofing.
 - b. Review in detail job conditions, schedule, construction sequence, application requirements, and quality of completed installation.
 - c. Review methods for storing and handling materials.
 - d. Review in detail the means of protecting completed work during remainder of construction period.
 - e. Discuss the acceptance of the substrate as indicated under "Execution" below.
 6. Contractor shall produce meeting notes that record discussions of meeting and any conflict, incompatibility, or inadequacy and they will indicate that the installer of roofing has reviewed and accepted the substrates for roofing.
 7. Distribute meeting notes to all attendees prior to installation of roofing.
- C. [Sequencing:]
- D. Scheduling:
1. Do not install final built-up bituminous roofing until all other work on roof has been completed.
 2. Schedule work started in particular area to permit completion, inclusive of installation of bitumen, gravel, or protection boards where required, at the end of each workday. Phased construction of final built-up bituminous roofing will not be permitted.

1.05 [SUSTAINABLE CHARACTERISTICS]

- A. Section 01 35 63 - Sustainability Project Requirements: Requirements for sustainable design compliance.
- B. Materials and Resources Characteristics:
1. [Recycled Content Materials: Furnish materials with maximum available recycled content including:
SPEC NOTE *List materials specified in this section required to have recycled content.*
 - a. [_____].
 2. [Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project site.]
SPEC NOTE *List materials specified in this section required to be regional materials.*
 - a. [_____].

1.06 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.
- B. Product Data including manufacturer's literature describing built-up bituminous roofing materials.
- C. Certifications: Submit the following certifications indicating that:
 - 1. Built-up bituminous roofing installer's qualifications Specified in this Section.
- D. Samples: Only as requested.

1.07 [SUSTAINABLE DESIGN SUBMITTALS]

- A. Section 01 35 63 - Sustainability Project Requirements: Requirements for sustainable design submittals.
- B. Manufacturer's Certificate: Certify products meet or exceed specified sustainable design requirements.
 - 1. Materials Resources Certificates:
 - a. Certify recycled material content for recycled content products.
 - b. Certify source for regional materials and distance from Project site.
 - 2. Indoor Air Quality Certificates:
 - a. Certify volatile organic compound content for each interior [adhesive] [and] [sealant] and related primer.
- C. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.
 - 1. Provide cost data for the following products:
 - a. Products with recycled material content.
 - b. Regional products.

1.08 QUALITY ASSURANCE

- A. [Provide products which are free from asbestos, and which comply with the applicable provisions of the California Volatile Organic Compound Regulations (VOC).]
- B. Built-Up Bituminous Roofing Installer's Qualifications:
 - 1. Installer shall be licensed or otherwise certified by manufacturer of accepted roofing system to do work requiring warranty, including materials and workmanship.
 - 2. Installer shall have applied accepted roofing system on two or more projects which have been completed for at least 10 years. Information on completed systems shall include date of installation, general contractor, owner, contact, and other related information which will facilitate verifications of qualifications.
 - 3. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of bituminous sheet roofing work and at any time roofing work is in progress, proper supervision of workers shall be maintained. A copy of the specification shall be in the possession of the Supervisor/Foremen and on the roof at all times.
- C. Respond immediately to correction of roof leakage during construction. If the contractor does not respond within 24 hours, University has the right to hire a qualified contractor and back charge the original contractor.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Labels: Clearly label materials except gravel with material name, production date or product code, and inspection agency approvals where required.

- B. Deliver, store, and handle packaged materials in original containers with seals unbroken and labels intact until time of use.
- C. Discharge materials carefully and store off ground, deck, or surface where material could become wet or damp, at temperatures maintained above 50 and below 75 degrees Fahrenheit. Protect from elements. Do not dump onto ground.
- D. Keep all moisture sensitive materials dry at all times while being transported, stored, and installed.
- E. Store materials on raised pallets. Do not double stack pallets.
 - 1. Cover top and all sides of moisture sensitive materials and allow for adequate ventilation.
 - 2. Utilize covers made from breathable materials.
- F. Handle materials in a manner to prevent damage. Store rolls in an upright position.
 - 1. Discard rolls which have been flattened or damaged.
 - 2. Remove damaged materials from the Site and replace with new materials.
- G. Avoid concentrated loading of building structure with materials. When storing pallets on the roof, locate over columns.
- H. Do not store materials or debris on newly installed roof surfaces.
- I. Store liquid materials such as adhesives, thinners, and cleaners in areas away from sparks, open flames, and excessive heat.
 - 1. No smoking is to be allowed in the area where solvent, adhesives, thinners, or welding agents are being used.
 - 2. Exercise caution at all times when working with solvent-type materials and comply with the limitations as described by the solvent manufacturer.
 - 3. Obtain specific approval of University prior to storage of flammable materials on project site.

1.10 SITE CONDITIONS

- A. Environmental Requirements:
 - 1. Proceed with roofing work when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.
 - 2. Do not apply built-up bituminous roofing when ambient temperature is below 40 degrees Fahrenheit.
 - 3. Apply built-up bituminous roofing in dry weather.

1.11 WARRANTY

- A. Correct defective Work within two year period after Date of Substantial Completion.
- B. Provide two year Contractor warranty for roof repair.

PART 2 PRODUCTS

2.01 [BUILT-UP ROOFING SYSTEMS]

- A. System [____]: Patching of existing built-up roofing.

2.02 MATERIALS

- A. Concrete Primers: Asphaltic type, ASTM D41.
- B. Felts, Fabrics, and Dry Sheet: Compatible with and equal to existing felts, fabrics, and dry sheets.
- C. [Asphalt: ASTM D312, type as recommended by built-up bituminous roofing manufacturer for region, climate and slope of roof and compatible with existing for roofing system.]
- D. [Cold Applied Adhesives and Cements: Type as recommended by built-up bituminous roofing manufacturer for region, climate and slope of roof and compatible with existing for roofing system.]
- E. Surfacing Aggregate: Clean, hard, and durable river aggregate conforming to ASTM D1863, gradation size No. 7, and as recommended by built-up bituminous roofing system manufacturer. Color of aggregate to match color of existing aggregate.
- F. Composition Flashing Systems: All composition flashing systems are to be modified asphalt by same manufacturer as roofing system or built-up bituminous roofing manufacturer's standard.
- G. Fabric Reinforcement: Bituminous woven glass fabric meeting requirements of ASTM D1668.
- H. Cants: Fiberboard, minimum 3 inch vertical leg, 4 inch wherever possible, 45 degree slope.
- I. Fasteners: As recommended by roofing material manufacturer.
- J. Other Accessories: As recommends by built-up bituminous roofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive built-up bituminous roofing and verify that:
 - 1. Surfaces are smooth, clean, dry, and free of loose particles.
 - 2. Voids in substrate have been patched flush with surrounding surfaces.
 - 3. Nailers, reglets, other embedded items, and items to penetrate surfaces have been installed.
 - 4. Conditions are otherwise satisfactory for application.
- B. Verify that new flashings and other related items have been installed or fabricated and are on Site ready for installation when roofing work commences.
- C. Assure that related work has been completed, and that the sequence of the flashing work may proceed in accordance with good flashing practice and the intent of the Specifications.
- D. Notify University's Representative immediately in writing of any discrepancy between field conditions and the ability to achieve the intent of these Specifications, and do not proceed with the work until adequate correction has been made.
- E. Do not start work until unsatisfactory conditions have been corrected. Start of work shall signify acceptance of, and responsibility for, condition of receiving surface.

3.02 PREPARATION

- A. Protection:
 - 1. Protect surrounding work from damage by roofing materials or operations; especially protect paving and building walls adjacent to hoists and kettles.
 - 2. Prevent asphalt, aggregate, and debris from entering and clogging roof drains and rainwater conductors.
 - 3. Protect existing fresh air intakes, doors, and windows as required to prevent entry of asphalt fumes.
 - 4. Be responsible for costs of repair or restoration of other work damaged by materials or operations of built-up bituminous roofing
- B. Clean roof and flashing areas thoroughly of loose materials and foreign matter to provide sound, dry, and level decks for positive attachment of roof system materials.
- C. Existing Roofs Areas:
 - 1. At areas to be altered, remove loose aggregate and aggregate that is not firmly embedded where new penetrations occur, or repairs are required.
 - a. Remove aggregate two feet beyond areas to be cut.
 - b. Clean, dry, and store aggregate away from the roof area when the aggregate is reused.
 - c. Remove aggregate not used from roof.
 - 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 [adhesive or] cement and one layer of 15 pound felt strip cut to extend six inches on each side of cut surface. Bed strip in roof cement and cover strip with roof [adhesive or] cement to completely embed the felt.
 - 3. Either bend up cap flashing or temporarily remove cap flashing at built-up base flashing to be repaired. Brush and scrape away deteriorated and loose asphalt, felts, or surface material of built-up base flashing.

3.03 GENERAL APPLICATION REQUIREMENTS

- A. Apply built-up bituminous roofing and related work in accordance with approved materials manufacturer's specifications for systems approved for this Project and meeting requirements of CBC Chapter 15, except where other requirements are indicated or specified.
- B. Make attachments to metal work and accessories integral with waterproofing in accordance with approved built-up bituminous roofing manufacturer's recommendations.
- C. Asphalt:
 - 1. Do not exceed temperature limitation recommend by roofing materials manufacturer for heating asphalt.
 - a. Asphalt shall be applied at its Equiviscous temperature (EVT) for the method of application being used, plus or minus 25 degrees Fahrenheit.
 - b. Do not exceed the flash point.
 - c. Do not exceed the finishing blowing temperature.
 - 2. Provide clearly visible thermometer on each kettle or delivery truck used to heat asphalt.
 - 3. Remove overheated asphalt from site immediately.
 - 4. Do not apply hot asphalt under conditions that would cause foaming.]
- D. Lay multiple-ply courses of felt and [hot asphalt] ~~--or--~~ [cold applied adhesive or cement] in shingle plies, and comply with recommendations of roofing material manufacturer.
 - 1. Lap felts with direction of drainage.
 - 2. Start installation of plies at lowest point of roof, with plies perpendicular to slope of roof deck.
 - 3. [Except where spot mopping sheets, lay felt plies in asphalt while still hot and tacky and broom thoroughly for full felt width to eliminate trapped air or gases.]
 - 4. Lay out roof areas accurately for proper lap and sequence of plies.

5. Lay out plies accurately and broom each into hot, tacky asphalt.
 6. Ensure felts are free from fishmouths, buckles, blisters, and other faulty workmanship.
 7. Built-up bituminous roofing displaying voids will be rejected.
 8. Do not use wet, once wet, or damaged rolls.
- E. Provide cant strips where indicated, where required, and wherever feasible to prevent 90 degrees bending of membrane system. Turn up all membranes up on cant strip where they abut against vertical surface.
- F. Provide membrane base flashings at cant strips and other sloping and vertical surfaces, at roof edges, and at major penetrations through roof deck. Nail or provide other forms of mechanical anchorage of membrane flashing to vertical surfaces as recommended by roofing material manufacturer.
- G. Cant Strips:
1. Install at intersection of vertical surfaces and where otherwise required.
 2. Install into hot asphalt to top of insulation.
 3. Mechanically fasten into nailers with square head roofing nails at 12 inches on center, minimum three nails per piece. Utilize nails with sufficient length to achieve minimum 1-1/2 inch penetration into nailers.
 4. Miter corners for tight fit.

3.04 ALTERATIONS TO EXISTING ROOF

- A. Match existing roofing construction. Use [asphalt]~~--or--~~[cold applied adhesive or cement] compatible with existing for roof alteration.
- B. Perform alterations, maintenance, and repairs to roof membrane as soon as possible after membrane has been cut or damaged, with permanent new work as specified for new work and as specified in the following paragraphs. Repair items damaged in surface preparation and aggregate removal.
- C. Apply new roofing adjacent to existing roofing in accordance with roofing materials manufacturer's recommendations.
- D. Complete application of built-up bituminous roofing daily up to line of termination at end of day's work. Daily aggregate surfacing is not necessary.
- E. Apply roofing felts in a solid, continuous asphalt moping:
1. Lay plies straight and flat.
 2. Apply all ply sheets so they are properly shingled to flow of water.
 3. Provide enough overlap so that every cross section will have required number of plies.
 4. Stagger all end laps at least 12 inches.
 5. Install one extra ply sheet, 36 inches wide, at all waterways.
- F. Ensure full and continuous seal and contact between [asphalt]~~--or--~~[cold applied adhesive or cement] and ply sheets or base sheets, including ends, edges, and laps by applying asphalt uniformly and by brooming fully before asphalt cools.
1. Use minimum 34 inch wide brooms or squeegees.
 2. [Do not walk on membrane until asphalt cools down.]
 3. Keep equipment off hot membrane.
- G. Do not allow sheets to contact other sheets even at roof edges or over cants and tapered edge strips.

1. Cut out fishmouths or side laps not completely sealed with asphalt, and patch with ply sheet set in hot asphalt.
2. Remove and replace all sheets which are fully and continuously bonded or which have inadequate mopping along end or edge laps.

H. [At Roof Edges and Openings: Provide bleed sheets (felt envelopes) to prevent asphalt drippage.]

3.05 [SURFACING]

- A. Do not install surfacing until the inspection of the membrane has been performed and “punch list” repairs have been completed.
- B. Aggregate:
 1. Aggregate surfacing to fully cover all membranes and strip flashing surfaces.
 2. Coat roof surface with uniform and continuous layer of asphalt at minimum rate of 60 pounds per square foot unless otherwise indicated.
 3. Apply aggregate into [hot asphalt]--~~or~~--[cold applied adhesive or cement], uniformly at a minimum rate of 400 pounds per square foot. Ensure complete coverage and minimum 50 percent embedment.

3.06 CLEANING

- A. Remove bituminous markings from adjacent finished surfaces.
- B. Repair or replace defaced or disfigured finishes caused by Work of this Section
- C. In areas where finished surfaces are soiled by bitumen or other source of soiling caused by Work of this Section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- D. At completion of the work of this section, remove all excess materials, cartons, wrappings, and tools and implements from the Site.

3.07 PROTECTION

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials. Provide special protection or avoid heavy traffic on completed work when ambient temperature is above 80 degrees Fahrenheit.

END OF SECTION