SECTION 07510
BUILT-UP BITUMINOUS ROOFING

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Roof insulation.
2. Built-up roofing.
3. Vapor barrier.
4. Base flashing and accessories.
5. Aggregate surfacing.

B. Related Sections:

2. Section 06100 - Rough Carpentry: Wood nailers.
4. Division 15 - Mechanical: Rooftop equipment supports and penetrations.
5. Division 16 - Electrical: Rooftop equipment supports and penetrations.

1.2 SYSTEM DESCRIPTION:

A. Minimum Requirements:

1. All products comprising the total roofing system, including the insulation, shall be acceptable to the roofing system manufacturer.
2. The published and written general requirements and specific recommendations of the various materials manufacturers shall become a part of the project specification to the extent referenced hereinafter.
3. The manufacturer's recommendations will govern the construction when not in conflict with the specific provisions of the project specification.
4. In the event of conflict, the specific provisions of this specification will prevail over such requirements or recommendations of the manufacturers. Any such conflict shall be called to the attention of the General Contractor, Architect, and Owner with submittal.
5. Provide vapor barrier for roofs over pools, shower rooms, kitchens, and other high humidity areas recommended by roofing manufacturer, and where determined necessary by the Architect. Provide vapor barrier of type recommended by roofing manufacturer.
6. Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

7. Installed built-up roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Built-up roofing and base flashings shall remain watertight.

1.3 SUBMITTALS:

A. Submit roofing system manufacturer's product data for built-up roof system and components, including:

1. Ply felts.
2. Base sheets.
4. Vapor Barriers.
5. Accessory Products.

B. Submit roofing system manufacturer's certification for this specific project listing the roofing system components and indicating the roofing system will be issued a warranty at project completion. Certification shall be submitted prior to roofing application.

C. Shop Drawings: For tapered insulation systems, furnish layout shop drawings showing thickness, slopes, valleys, ridges, top elevations, straight and tapered unit locations, as required to provide uniform drainage pattern and meet thermal performance requirements.

D. Submit samples of each type of piping and conduit support for approval. Include detail indicating method of anchorage to roof structure and method of flashing. Coordinate with Divisions 15 and 16.

E. Manufacturer’s Standard Details: Furnish copies of the roofing system manufacturer’s standard roofing details showing the materials and configuration of flashing plies to be utilized.

F. Manufacturer's Certification indicating that bituminous materials (asphalt) delivered to project comply with required standards. Include quantity and statistical and descriptive data for each product. Provide certification indicating flash point (FP), finished blowing temperature (FBT), softening point (SP), and equiviscous temperature (EVT).
G. Installer Certification: Submit written certification from the roofing system manufacturer certifying that Installer is approved by manufacturer for installation of specified roofing system. Letter shall be dated not more than 6 months prior to roofing system application.

H. Certification by the roofing system manufacturer that the roofing system complies with the performance requirements, including wind uplift and UL Class A requirements.

I. Warranty: Sample copy of roofing system manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.

J. Submit aggregate sample for approval of color and size.

1.4 QUALITY ASSURANCE:

A. Qualifications:

1. Applicator: Company specializing in built-up bituminous roof application with 5 years continuous experience under the same company name, approved by roofing materials manufacturer, and who has installed a minimum of 500 squares of similar roofing to the type required for this project during that 5 years.

2. Roofing components shall be provided from a single manufacturer source to assure compatibility and conformance to manufacturer's warranty conditions.

3. Installer's Field Supervision: Require roofing Installer to maintain a full-time supervisor on the job site during application of built-up roofing and who is experienced in the installation of roofing system.

B. Regulatory Requirements:


3. Design roof system to resist wind velocities specified by UCB Standard 03740 and the latest version of the International Building Code, Chapter 16.

C. Pre-installation Conference:

1. Convene a pre-installation conference one week prior to commencing work of this section and after approval of system, submittals and foreman's resume.
2. Require attendance of parties directly affecting work of this section including: Foreman of each type of roofing, campus roofer, professional roofing consultant, and inspector.

3. Review installation procedures and coordination required with related work including the following:

   a. Review the specifications and details with the Owner, Contractor, Architect and roofing applicator.

   b. Confirm that the applicator and manufacturer accept the roofing specifications and details as a proper and functional system. If the applicator and manufacturer have any apprehension or concerns they shall discuss and resolve them at this time.

   c. Confirm that the applicator and manufacturer accepts the roofing substrate. Coordinate with appropriate party any remedial action required to make substrate acceptable.

   d. Establish where the roofing project will start and how the installation will proceed.

   e. Determine what type of equipment will be used for the roofing application.

   f. Resolve where and how the materials are to be stored on the project.

   g. Determine the weather conditions under which the roofing applicator will install the roofing system. The Architect, Owner and Contractor must acknowledge that if the weather conditions do require the roofing applicator to stop the installation of the roofing system that pressure will not be brought to bear on the roofing applicator to ignore the predetermined conditions and continue the installation. (Provide for contingent temporary dry-in under all circumstances.)

   h. Establish a program with the mechanical subcontractor as to exactly how and where the mechanical equipment will be transported across the roof area. If two men cannot carry the equipment to the base it shall be placed directly on the base by crane. Under no conditions can any equipment or materials be transported across roofing without the prior approval of the roofing applicator, and adequate protection -- weight/point loading shall be reviewed and approved prior to placement.

   i. All penetrations and walls must be in place prior to the roofing application.

   j. Establish a program for controlling all traffic across finished roofing.
1.5 WARRANTY:

A. Contractor’s Warranty: Submit executed copy of standard 2-year "Roofing Guarantee", covering work of this section including roofing membrane, composition flashing, roof insulation, vapor retarders (if any), and roofing accessories, signed and countersigned by Installer (Roofer) and Contractor.

B. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's 20 Year Labor and Materials Guarantee, signed by an authorized representative of the roofing system manufacturer. Guarantee shall cover roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover board, and other single-source components of the roofing system. Guarantee shall have unlimited dollar coverage for the full period of the guarantee and shall not be subject to a deductible.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. GAF Building Materials Corp.
B. Johns Manville.
C. Firestone Building Products Company.

2.2 ROOFING SYSTEMS:

A. Factory Mutual Class 1, U.L. Class A type roofing system with FM I-90 windstorm rated for installation over specified deck system.

B. Built-Up Roofing System: Four-ply, asphalt applied glass-fiber reinforced felts, with insulation and gravel surface.

C. Comply with roofing system manufacturer's recommendations for component roofing system materials as required for manufacturer's warranty.

2.3 SHEET MATERIALS:

A. Glass Fiber Felts: ASTM D2178, Type IV or VI.

B. Backer Sheet: Furnish one of the following base plies under the modified bitumen base flashing in accordance with the roofing system manufacturer’s requirements for the specified warranty period.

1. ASTM D 4601, Type II, asphalt-impregnated and coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.
2. ASTM D 6164, Grade S, Type I, polyester-reinforced, SBS-modified asphalt
sheet, smooth surfaced.


2.4 BITUMINOUS MATERIALS:

A. Asphalt Bitumen: ASTM D312, Type III and Type IV as recommended by the built-up roofing system manufacturer for existing slope and specified application.

B. Asphalt Primer: ASTM D41, Type III.

C. Asphalt Roofing Cement: ASTM D4586, Type I, asbestos free.

2.5 INSULATION:

A. All insulation shall bear U.L. label.

B. Total insulation thickness shall be have a minimum average thermal resistance of R-30. R-value shall be calculated at 5.56 per inch.

C. Insulation: Polyisocyanurate board insulation, ASTM C 1289, Type II, Class 1, Grade 2 with felt or glass-fiber mat facer on both major surfaces. Where boards are hot mopped, limit maximum board size to 48” x 48”.

C. Tapered Insulation: Polyisocyanurate board insulation, ASTM C 1289, Type II, Class 1, Grade 2 with felt or glass-fiber mat facer on both major surfaces. Slope structure to achieve drainage on new construction and use tapered insulation for crickets only.

1. On existing roofs with no structural slope, use tapered insulation as required to achieve adequate drainage.

2. On new roofs, use tapered insulation with a minimum primary slope of 0.25” per foot.

D. Cover Board Insulation: Perlite Board Insulation: ASTM C 728, rigid, mineral-aggregate thermal insulation board composed of expanded perlite, cellulotic fibers, binders, and waterproofing agents with top surface seal coated.

1. Cover Board Thickness: 0.75” min.
2.6 AGGREGATE SURFACING:

A. Aggregate: ASTM D1863, Size No. 7; sound, hard, washed, clean river gravel, 400 lb/sq.

1. Embed aggregate in flood coat of asphalt.

2.7 MISCELLANEOUS MATERIALS:

A. Fiber Cant and Tapered Edge Strips: Asphalt impregnated wood fiberboard, preformed to 45 degree angle. Wood cants may be used provided they are preservative treated and conform to roofing system manufacturer's recommendations.

B. Roofing Nails: Galvanized or non-ferrous type, size as required to suit application.

C. Traffic Surfacing: 24”x24”x1-1/2” concrete pavers, 8,000 psi, min. over granular surfaced modified bitumen slip sheet.

E. Mechanical Fasteners for Insulation: Appropriate to purpose intended and approved by Factory Mutual; length required for thickness of material; corrosion resistant. Ensure at least 3/4” penetration.

F. Fibered Aluminum Roofing Coating: Leafed aluminum pigment in a non-asbestos fibered asphalt base; ASTM D 2824, Type III.

G. Self-Adhering Underlayment: High temperature rated, 40 mil (minimum) self adhesive waterproofing material composed of rubberized asphalt and synthetic resins, with tensile strength of 250 psi (ASTM D412) and elongation of 250% (ASTM D 412).

H. Pourable Sealer: (For use as a pitch pan filler material). Two-part polyurethane based material. Color: Black. Store in original unopened containers at temperatures between 60°F and 80°F until ready for use.

E. Prefabricated Control or Expansion Joint Flashing:

1. 60 mil EPDM sheet bellows with closed cell urethane foam backing, seamed into 26 gage galvanized metal flashing flanges, including counterflashing each side.

2. Install control and expansion joints on curb in conformance with NRCA recommendations.
F. Thermal Barrier (only where required): ASTM C442 gypsum backing board or ASTM C36 gypsum board, 0.625" thick, Type X, 4' width, square edge.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Comply with insulation manufacturer's instructions and recommendations for the handling, installation, and bonding or anchorage of insulation to substrate.

1. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
2. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

B. Vapor Barrier (when specified): Apply two layers of roofing felt set in a hot mopping of steep asphalt.

C. Curb height shall be 12” above finished roof.

D. Cant Strips/Tapered Edge Strips: Install preformed 45-deg insulation cant strips at junctures of built-up asphalt roofing system membrane with vertical surface.

E. Base Flashing: Apply flashing only after the built-up roofing has been installed, but prior to aggregate surfacing.

1. Apply backer sheet to substrate prior to installation of modified bitumen sheet.
2. Install all flashings in accordance with manufacturer's current published details or details in contract drawings, whichever is more stringent.
3. Extend base flashings a minimum of 4" past the toe of the cant strip on to the field of the roof surface and a minimum of 8" up vertical surfaces.
4. Fasten top edge of all base flashings a maximum of 4" o.c.
5. All vertical laps and outside corners in the flashing membrane shall be stripped-in with a five course application of 6" fiberglass mesh and flashing cement or two part modified flashing cement.
6. Coat all exposed base flashing with fibered aluminum coating at a rate of 1 gallon per 100 s.f. in two applications.

C. Four-way tapered insulation sumps must be installed at all roof drains. Sumps shall be 4’x4’, min. and shall slope at 1/2" per foot.
D. Fume Recovery: The Contractor is required to utilize a fume recovery unit on all asphalt kettles.

E. Install flood-coat of asphalt and cast the gravel into the hot asphalt in a uniform course at an average rate of 400 pounds per square, plus or minus 10%. 60% min. of aggregate must be embedded into the flood coat. Do not install aggregate surfacing over modified bitumen walkways.

3.2 FIELD QUALITY CONTROL:

A. The Owner (or the Owner through its Inspection Service) will determine during the course of the roofing work whether to proceed with a sample cutting and testing program, based upon his judgement as to whether material quantities and workmanship used in the work actually comply with the requirements.

B. The Owner will engage test laboratory for the testing of roofing samples removed by the Installer.

C. Cut, remove and test samples in compliance with ASTM D2829.

D. Repair cutouts immediately after removal of samples. Strip aggregate surface back and place the same number of plies of felt and mopping required by the specification, applied over the cut with the first sheet overlapping the cutout area by at least 6" on all sides, with each succeeding sheet overlapping the previous sheet by at least 3" on all sides. Replace surfacing or coating to match surrounding roofing.

F. Deficiencies: Where test laboratory reports indicate a shortage in the required weights or count plies, discontinuity of mopings, or other deficiencies in the work, Installer will replace defective work.

END OF SECTION 07510