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:

1. Section 06100 - Rough Carpentry: Wood nailers.
2. Section 07530 - Single Ply Membrane Roofing.
4. Division 15 - Mechanical: Rooftop equipment supports and penetrations.
5. Division 16 - Electrical: Rooftop equipment supports and penetrations.

1.2 SYSTEM DESCRIPTION:

A. Manufacturer's Recommendations:

1. All products comprising the total roofing system, including the insulation, shall be acceptable to the roofing membrane 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. Provide vapor barrier of type recommended by roofing manufacturer.
1.3 SUBMITTALS:

A. Submit product data for membrane and base flashing materials.

B. Provide number of copies as requested, but not less than 3, of the manufacturer's specifications and application instructions for all roof installations used; one copy each shall be furnished to the Owner and the Architect and one copy shall be kept on the job site until the roof installation is complete.

C. Submit certification of manufacturer's approval of this specific project regarding warranty requirements. Certification shall be submitted prior to roofing application.

D. Submit manufacturer's certification that materials meet or exceed specified requirements.

E. 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.

F. Submit two 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.

G. Submit aggregate sample for approval -- color, size, weight, etc.

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 indicated on the Boulder County Wind Map. Note that wind speeds vary across the campus, but will not be less than 90 mph. Exposure should be appropriate to location.

C. Preinstallation Conference:

1. Convene a preinstallation 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 pre-determined 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. Provide roofing manufacturer's ten year warranty, including flashing endorsement, to be furnished upon completion and acceptance of the roofing installation.

B. Warranty, in writing, the roof, flashing, and sheet metal work against leakage and other defects, due to failure in materials or workmanship for 2 years from the date of Notice of Acceptance. The Contractor shall repair all damages due to failures covered above at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. GAF Building Materials Corp.

B. Schuller International, Inc.

C. Tamko Asphalt Products

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. Base Sheet: ASTM D2626, No. 45; plain.

2.4 BITUMINOUS MATERIALS:

A. Asphalt Bitumen: ASTM D312, Type I and Type III.
B. Asphalt Primer: ASTM D41.


D. Asphalt Emulsion: ASTM D1227, Type I or II.

E. Flashings: SBS flashing with polyester reinforcing acceptable to primary roofing membrane manufacturer with granular surface.

2.5 INSULATION:

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

B. Total insulation thickness shall be a minimum of 3 inches with an average thermal resistance R-Value = 30. Where boards are hot mopped, limit maximum board size to 48” x 48”.

C. Insulation: FS HH-I-1972; polyisocyanurate foam with bituminous saturated roofing felt facings; thermal resistance (R-Value at 75°F.) when aged in accordance with RIC/TIMA Bulletin 281-1 but not to exceed 5.56 per inch.

D. Insulation: ASTM C728; expanded perlite mineral aggregate board; density of 10 lb./cu. ft.; K factor of 0.36; square edges.

1. Overlay Board: 0.75” thickness.
2. Tapered Insulation Board: 1” thickness.
3. Slope of Tapered Insulation Board: To achieve a minimum slope of 0.25” per foot.

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. Remove loose gravel.

2.7 CANTS:

A. Fiber Cant and Tapered Edge Strips: Asphalt impregnated wood fiberboard, preformed to 45 degree angle.

B. Wood cants may be used provided they are preservative treated and conform to roofing system manufacturer's recommendations.
2.8 ACCESSORIES:

A. Insulation Joint Tape: Asphalt treated glass fiber reinforced; 4 to 6 inches wide; self adhering.

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

C. Traffic Surfacing: 24” by 24” concrete pavers should be used. Use granular surfaced modified for slip sheet.

D. Mechanical Fasteners for Insulation: Appropriate to purpose intended and approved by Factory Mutual; length required for thickness of material; corrosion resistant. Ensure at least ¾” penetration.

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: ASTM C442 gypsum backing board or ASTM C36 gypsum board, 0.625” thick, Type X, 4’ width, square edge.

PROVIDE THERMAL BARRIER ONLY WHERE REQUIRED.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install roofing, flashing and insulation in strict accordance with manufacturer's instructions.

B. Vapor Barrier: Apply two layers of roofing felt set in a hot mopping of steep asphalt within the insulation, below the dew point.

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. For each 100 squares of fully completed roofing (or fraction thereof) remove 1, 12" x 12" template-cut samples for testing. Remove samples at locations as directed.
E. 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 moppings, or other deficiencies in the work, Installer will replace defective work.

G. Curb height shall be 12” above finished roof

H. Drains should be sloped. 4’ by 4’ taper, gradual slope to drain.

END OF SECTION 07510