PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

1. Roofing membrane.
2. Roof insulation.
3. Base flashing.
4. Vapor retarder.
5. Fasteners, adhesive and sealants.

B. Related Sections:

1. Section 07600 - Flashing and Sheet Metal.

1.2 PERFORMANCE REQUIREMENTS:

A. Installed roofing membrane and base flashings shall withstand specified wind uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, and other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Provide roofing materials that are compatible with one another under conditions of service and application required.

C. Provide membrane roofing system that has been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7. Design roof system to resist local Boulder County wind velocities, but no less than 110 mph, Exposure C. Note that wind speeds vary across the campus.

C. Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals RoofNav for noncombustible construction.

D. Provide materials which have been tested and listed by UL for Class A exterior fire-test exposure.

E. Provide roofing system with initial Solar Reflectance Index of not less than 78
when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

1.3 SUBMITTALS:

A. Product data for roofing membrane, flashing membrane, and all accessory products.

B. Product data for specified roof insulation.

C. Product data for specified cover board.

D. 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.

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

F. 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.

F. Shop Drawings:

1. Submit shop drawings showing sheet layout, seam locations, penetrations, special conditions and details not standard with the manufacturer.

2. 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.

G. Samples of field membrane, roof insulation, and walkway pads.

H. 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.

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

J. Maintenance data for installed roofing system to be included in closeout documents.
1.4 QUALITY ASSURANCE:

A. Qualifications:

1. Roof applicator shall have minimum of 5 years satisfactory continuous experience under the same company name and shall be approved in writing by roof system manufacturer for application of roof for which warranty will be issued. Submit satisfactory evidence of conformance.

2. Roof system manufacturer shall have roofing systems installed in the metro area with a minimum of 5 years satisfactory continuous performance. All components of proposed system shall be the same as system which has had 5 years satisfactory performance.

B. Pre-Roofing Conference:

1. Meet at the project site and review requirements for the work and conditions which could possibly interfere with successful performance of the work. Require every party who is concerned with the work, or required to coordinate with it or to protect it thereafter, to attend the conference.

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

3. Where roofing is required to be guaranteed by the manufacturer, require manufacturer's technical representative to participate in the conference.

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 - MATERIALS

2.1 ACCEPTABLE ROOFING SYSTEMS:

A. EPDM Sheet: ASTM D 4637, Type I, of the following grade, class, thickness, and exposed face color:
   1. Grade and Class: Grade 1, Class U, unreinforced.
   2. Thickness: 90 mils. 60 mil may be acceptable on a project by project basis. 45 mil is not acceptable.
   5. Acceptable Manufacturers:
      a. Firestone Building Products Company
      b. Carlisle Syntec.
      c. Versico Roofing Systems.

B. KEE Sheet: ASTM D 6754-02 of the following thickness and exposed face color:
   1. Thickness: 60 mils, nominal
   2. Exposed Face Color: Standard off-white.
   3. Acceptable Manufacturer:
      a. FiberTite Roofing System, Seaman Corporation, FiberTite-XT.

C. Thermoplastic Polyolefin (TPO) Sheet: ASTM 6878-03 of the following thickness and exposed face color.
   1. Thickness: 80 mils, nominal
   2. Exposed Face Color: Tan
   3. Acceptable Manufacturers:
      a. Firestone Building Products Company, UltraPLY.
      c. Versico Roofing Systems, VersiWeld

2.2 SINGLE-PLY ROOFING SYSTEM DESIGN REQUIREMENTS:

A. Adhered Roofing Membrane System: Single-ply membrane must fully adhered to the substrate. Mechanically fastened and ballasted roofing systems are not allowed without specific approval by CU Facilities Management.

B. Roofing system must incorporate a high density cover board applied over the thermal insulation. Adhering the membrane directly to isocyanurate insulation is prohibited.
C. Cover board must be adhered in insulation adhesive to conceal insulation fasteners and plates.

D. Insulation shall be mechanically fastened to metal decks. Insulation shall be adhered to concrete decks.

E. 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.

F. Thermal Barrier: ASTM C442 dens-deck, 5/8" type X or ASTM C36 gypsum board, 0.625" thick, Type X, 4' width, square edge.

2.3 INSULATION:

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

B. 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.

2.4 COVER BOARD:

A. Subject to compliance with requirements, furnish and install one of the following cover board types.

1. ASTM C 1177, non-structural, glass mat-faced roof boards with a non-combustible, water-resistant and silicone-treated gypsum core panel.

   a. GP Dens-Deck “Prime”
   b. Thickness: 1/2"
2. High density polyisocyanurate insulation cover board.
   a. Firestone ISOGARD HD Cover Board.
   b. Carlisle SecurShield HD Cover Board.
   c. Versico SecurShield HD Cover Board.
   d. Thickness: 1/2"

2.5 ACCESSORY MATERIALS:

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Reinforced Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as primary sheet membrane.

C. Non-Reinforced Sheet Flashing: Manufacturer's standard unreinforced sheet flashing, of same color and thickness as sheet membrane. Use uncured or unsupported membrane as field fabrication membrane for corners, patches, pipes, and other irregular shapes.

D. Bonding Adhesive: Manufacturer's solvent-based bonding adhesive designed for bonding membrane and flashing to vertical and horizontal surfaces.

E. Metal Termination Bars: Manufacturer's standard pre-drilled aluminum bars, approximately 1 inch by 1/8 inch thick with lead/stainless steel drive-pin anchors.

F. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions and load capacities according to ASTM E 488. Fasteners must be designed and approved by roofing manufacturer for fastening insulation to substrate. Length as required to secure insulation system and penetrate deck for proper securement.

G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories.

2.6 SHEET METAL ACCESSORY MATERIALS:

A. Refer to Section 07620, "Sheet Metal Flashing and Trim".

B. Clad Metal: PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. PVC Clad Metal shall be a 25 gauge, min., G90 galvanized metal sheet with a 20 mil (0.5 mm) unsupported PVC membrane laminated on one side. Clad metal shall be supplied by the roofing system manufacturer in accordance with the rated assembly.
PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install specified vapor barrier. Install substrate board on metal decks prior to installation of vapor barrier.

B. Mechanically Fastened Insulation: Secure first and subsequent layers of insulation to metal deck. Adhere insulation to concrete decks.

1. Do not use fasteners which will damage the vapor retarder, if any.

C. Curb height from finished roof shall be 12” from roof to top of curb.

D. Where open adhesive containers are used, ensure lids are on cans when placed around any air intakes to prevent fumes from migrating into the air handling systems.

E. When job is completed, check all seams to ensure there are no cold welds.

F. Use clad sheet metal for all scuppers and overflows and edge metal where necessary.

G. All pipe penetrations shall utilize roofing system manufacturer's pre-fabricated boots where possible. Use two-piece field wraps on pipes only where boots cannot be installed due to field conditions.

H. Install 6” x 6” patches of unsupported membrane over all t-laps in the field and flashing seams of the roof.

3.2 PROTECTION AND CLEANING:

A. Protect membrane roofing system from damage and wear during remainder of construction period when other trades are working on finished product. Large areas of damage will require removal and replacement (not just patching) prior to final acceptance.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements. Repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration prior to Final Acceptance and according to warranty requirements.

C. Clean all asphalt, foot traffic discoloration, over spray and spillage off of roofing membrane and flashing using power washer with cleaning agents and procedures recommended by manufacturer of affected construction.
END OF SECTION 07530