

SECTION 07530  
EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions and Division 1 - General Requirements, apply to work specified in this Section.

1.02 SUMMARY

- A. This Section specifies EPDM membrane re-roofing of area of existing EPDM roofing that is going to be disturbed by mechanical Work. Work includes:
1. Removal of existing roofing system to deck in area indicated on Drawings.
  2. Installation of new membrane roofing system adhered over insulated concrete deck, including roofing insulation.
- B. Alternate: This work is part of Alternate No. 5, Science Wing Exhaust. Refer to Section 01230 for description of Alternates and administrative requirements applicable to Alternates.
- C. Related Work Specified in Other Sections:
1. Wood nailers, curbs, and blocking: Section 06100, "Rough Carpentry."
  2. TPO roofing on roof of the addition: Section 07540.
  3. Sheet metal flashing: Section 07720
  4. Roof drain relocation: Division 15 Sections.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are identical to or compatible with the existing roofing system to which the new roofing ties in, and also compatible with one another under conditions of service and application required.
- C. Wind Uplift Resistance: Provide a membrane roofing system that will resist design wind uplift pressures calculated in accordance with BOCA National Building Code 1999 edition for wind speed of 90 mph, I = 1.0, exposure B, as demonstrated by testing of identical materials by a qualified testing and inspecting agency. Basic uplift pressures are as follows:
1. Design Wind Uplift Pressure: 21 psf in field and 27 psf within 4'-0" of roof edge.
  2. Design and install the system to resist increased uplift pressure at perimeter and corners in accordance with the recommendations of the Single Ply Roofing Institute (SPRI) publication "Wind Design Guide for Low-Sloped Flexible Membrane Roofing Systems," current edition, or of the roofing system manufacturer, whichever is more stringent.

## 1.04 SUBMITTALS

- A. Product Data: For each type of product required for this installation.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
  - 1. Base flashings and membrane terminations.
  - 2. Tapered insulation, including slopes.
- C. Samples for Verification: For the following products:
  - 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing.
  - 2. 12-by-12-inch (300-by-300-mm) square of roof insulation.
  - 3. 12-by-12-inch (300-by-300-mm) square of walkway pads or rolls.
  - 4. 12-inch (300-mm) length of metal termination bars.
  - 5. Insulation fasteners.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.
- E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
- F. Qualification Data: For Installer and manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.
- H. Contract Closeout Submittals:
  - 1. Maintenance Data: For roofing systems to include in maintenance manuals.
  - 2. Warranties: Special warranties specified in this Section.
  - 3. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

## 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- B. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane or from a supplier approved by roofing membrane manufacturer.
- C. Fire-Test-Response Characteristics: Class A, as determined by testing of identical products and system per ASTM E 108 by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
- D. Preinstallation Conference: Conduct conference at Project site, attended by Owner, Architect, Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer,

and installers whose work interfaces with the EPDM roofing to discuss roofing tear-off and replacement. Comply with requirements in Section 01330, "Project Management and Coordination."

1. Review methods and procedures related to roofing system.
2. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
3. Review governing regulations and requirements for Owner's insurance if applicable.
4. Review temporary protection requirements for roofing system during and after installation.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight. If liquid material is not used within its stated shelf life, discard and legally dispose of it.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

#### 1.07 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

#### 1.08 WARRANTY

- A. Manufacturer's Special Project Warranty: For new roofing installed under this Contract, furnish Manufacturer's total system warranty, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failures include but are not limited to, fastener pull-out, failure of seams, delamination of adhesive bond, and roof leaks.
  1. Special warranty includes roofing membrane, base flashings, vapor retarder, roof insulation, adhesives, cover boards, walkway products, and other components of membrane roofing system furnished under this Section.
  2. Warranty Period: 15 years from date of Substantial Completion.
  3. Wind Speed Enhancement: 72 MPH.

## PART 2 - PRODUCTS

### 2.01 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type II, scrim or fabric internally reinforced uniform, flexible sheet made from EPDM, 60 mils thick, black color.
  - 1. Manufacturers: Carlisle SynTec Incorporated or Firestone Building Products Company.

### 2.02 AUXILIARY 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. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.
- C. Seaming Material: Single-component butyl splicing adhesive and splice cleaner, or manufacturer's standard synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film.
- D. Lap Sealant: Manufacturer's standard single-component sealant.
- E. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- F. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- H. Miscellaneous Accessories: Provide preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

### 2.03 VAPOR RETARDERS

- A. Polyethylene Vapor Retarder: 3-ply, fiber reinforced polyethylene sheet; perm rating 0.05 or less, measured per ASTM E-96. Furnish vapor retarder intended for use under single-ply roofing, approved by Factory Mutual for use in Class 1 construction, and acceptable to the roofing membrane manufacturer.
  - 1. Product: One of the following:
    - a. Reef Industries, "Griffolyn" Type 65 or Type -55 FR
    - b. Raven Industries, "Dura-Skrim"

### 2.04 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer, suitable for application with cold-applied adhesive, on both major surfaces. Furnish product that is manufactured by the Roofing System manufacturer, or is otherwise acceptable to the roofing system for this type of installation.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain and diverting water around rooftop mounted equipment. Fabricate to slopes indicated.

#### 2.05 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch (13 mm) thick.
- C. Fasteners: Factory-fluoropolymer-coated threaded or spike-type steel fasteners with 3-inch diameter plastic plates meeting corrosion-resistance provisions of FM 4470, designed for fastening roof insulation to structural concrete deck, and acceptable to roofing system manufacturer.
  - 1. Pull-Out Resistance: Minimum of 800 lbs per fastener when tested in field; higher if recommended by roofing membrane manufacturer.
  - 2. Length: Sufficient to penetrate concrete deck a minimum of 1-1/4 inch.
  - 3. Acceptable Product: Carlisle "HP Fastener" or "HP Concrete Spike."

#### 2.06 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick, and acceptable to membrane roofing system manufacturer.

### PART 3 - EXECUTION

#### 3.01 REMOVAL OF EXISTING ROOFING

- A. Remove existing roofing system, including insulation and vapor retarder down to the roof deck, within the area indicated on the Drawings to allow for installation of new and relocation of existing mechanical equipment, and to adjusting the slope for drainage to the relocated roof drain. Conform to Section 01732 requirements for cutting and patching, and to applicable requirements specified in this Section.
- B. Neatly cut the existing roof materials, using methods which are least likely to damage adjacent roofing construction to be retained or adjoining construction.

- C. Where existing roofing terminates at a vertical wall with cap or counterflashing, carefully lift the flashing just enough to permit removal of the existing membrane; take care not to damage the flashing.

### 3.02 EXAMINATION AND PRE-INSTALLATION TESTING

- A. Inspect surfaces to which roofing and flashing are to be applied. Do not proceed with installation of insulation and roofing if conditions exist which may compromise the performance of the roofing system. Beginning work on the roofing and flashing shall constitute acceptance of the surfaces as being satisfactory for the installation of the work.
  1. Verify that roof openings and penetrations are in place and set and braced and that roof drain is securely clamped in place.
  2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  3. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  4. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Insulation Fastener Pull-Out Tests: Test at at least 3 locations in the roof area to be covered. If pullout resistance does not meet specifications, notify roofing manufacturer in writing and obtain recommendation for changing the fastener, increasing frequency of fasteners, or other remedial measures.

### 3.03 PREPARATION

- A. Clean substrate to remove dust, debris, oils, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Sweep off loose material immediately before beginning work.
- B. Remove water and ice; do not install roofing over wet or frozen substrates.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Roof Drains: Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

### 3.04 VAPOR RETARDER INSTALLATION

- A. Loose lay vapor retarder over the roof deck. Lap seams and seal as recommended by manufacturer of vapor retarder. Also seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.
- B. After installation, inspect for tears and punctures. Repair these areas in accordance with vapor retarder manufacturer's written instruction.

### 3.05 INSULATION INSTALLATION

- A. General: Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- B. Install tapered insulation under area of roofing to conform to slopes indicated.
- C. Install two or more layers of insulation under area of roofing to achieve required thickness. Stagger joints of each succeeding layer a minimum of 6 inches (150 mm) in each direction from joints of previous layer.
- D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
- G. Install cover board over insulation, Install cover board with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together.
- H. Fasten insulation and cover board to the roof deck with sufficient fasteners, each driven to correct depth to meet specified performance requirements.
  - 1. Fastener Spacing and Layout: Comply with Factory Mutual requirements for 1-90 installation, and in no case provide fewer than one fastener per 4 square feet for insulation layer 2" or thicker, nor fewer than 2 fasteners in any one piece of insulation board.
  - 2. Drive fasteners so that they penetrate the concrete topping at least 1-inch and so that fastener plates do not crush the insulation.

### 3.06 ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps. Shingle side laps with slope of roof deck where possible.
- C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.
- D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

- E. Seams: Seams may be sealed with adhesive or tape at Contractor's option, so long as the seaming method used is acceptable to the roofing membrane manufacturer and will be warranted as specified.
  - 1. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
    - a. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.
  - 2. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
  - 3. When splicing new to existing membrane, clean existing membrane scrupulously, and lap new membrane over old at least 3 inches as splice. Comply with membrane manufacturer's instructions for cleaning old membrane; requirements are more stringent than cleaning of new membrane.
- F. Lap Sealant: Clean seam edges and apply a continuous bead of lap sealant 5/16" wide and feathered to completely cover the splice edge.
- G. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- H. If work is not completed in one day, install water cut-offs at membrane terminations and install temporary flashings where required for weather protection, or provide other temporary watertight covering over roof openings acceptable to Architect until patching is completed and roofing is weathertight. Remove water cut-offs and temporary flashings and protection immediately before resuming work.
- I. Repair: Repair wrinkles, fishmouths and punctures by cutting out and patching with a piece of EPDM membrane (same type - either cured or uncured - as membrane being repaired). Extend splice at least 3" beyond the boundaries of the cut in all directions.

### 3.07 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.



- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- F. Where roofing terminates at a previously existing vertical wall, carefully return the existing counterflashing to its original position, so that it laps the new baseflashing.

### 3.08 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.09 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- 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 at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07530