

**SECTION 075323 - FULLY ADHERED EPDM ROOFING**

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Furnish and install single-ply (fully adhered) membrane re-roofing system as shown on drawings and herein specified including, but not necessarily limited to:
  - 1. The removal of existing roof membrane and insulation, together with the metal flashings and other items as necessary for a complete re-roofing installation.
  - 2. Metal coping cap flashings, scuppers, downspouts, counter-flashings, and miscellaneous sheet metal work incorporated into the work shall be installed and made watertight as a part of the work of this section.
  - 3. Installation of wood nailers, wood edge strips and plywood backers are specified in accordance with manufacturer's specifications and/or as shown on drawings. Contractor shall coordinate the installation of all carpentry work required for the roof system herein specified.

## 1.3 RELATED WORK

- A. Section 076200 - Flashing and Sheet Metal

## 1.4 QUALITY ASSURANCE

- A. Contractor/Applicator Qualifications:
  - 1. Single-ply membrane roofing system shall be applied by a contractor approved by the manufacturer of the single-ply membrane roofing materials.
  - 2. Contractor and contract workers shall have previous experience in applying systems similar in size a complexity.
- B. Quality Control:
  - 1. The roof system shall comply with the guidelines of the Single-ply Roofing Institute in its "Wind Design Guide for Fully Adhered Single Ply Roofing Systems."
  - 2. The roof system shall comply with the recommendations of Factory Mutual Loss Prevention Data Sheet 1-29 particularly the Technical Advisory Bulletin on "Fully Adhered Roof Coverings."
- C. Inspection:
  - 1. Upon completion of the installation, an inspection shall be made by a field technical representative of membrane manufacturer to ascertain that the roofing system has been installed according to manufacturer's current published specifications and details.

## 1.5 SUBMITTALS

### A. Samples:

1. Submit for approval, samples of proposed materials prior to commencement of work.
2. Submit samples to the attention and address of the owner's representative.

### B. Shop Drawings:

1. Prepare and submit shop drawings of the single ply membrane system for owner's and/or architect/engineer's review. Shop drawings are required for starting the re-roofing work and for final inspection of the warranted roof. Shop drawings shall be made by the single-ply membrane manufacturer or manufacturer's representatives. Shop drawings shall be approved and assigned a number by membrane manufacturer.
  - a. Shop drawings shall indicate perimeter of building roof area, area of membrane replacement, location and type of penetrations, perimeter and penetration details, special details and itemized listing of materials required under this section, including quantities.

### C. Certification:

1. Immediately after award of contract, roofing contractor shall submit a list of materials in a letter format and documented evidence of conformance to specifications of proposed materials, complete with brand names, UL compliance and manufacturer's name of each product.
  - a. Submit a letter of compliance or certification from insulation and membrane manufacturers.

## 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

### A. Deliver material in manufacturer's original, unopened containers with manufacturer's labels intact and legible.

### B. Materials shall be stored as to protect them completely from damage by the elements and temperature.

1. Store curable materials to be used in conjunction with the membrane, in a dry, protected area and between 60 degrees F. and 80 degrees F. If exposed to lower temperature, restore to proper (minimum 60 degrees F.) temperature before using.

### C. Materials on ground and/or roof top (if approved by owner) shall be protected with waterproof coverings and stored on raised platforms in such a manner to be completely off the ground or roof deck surface (use of pallets or similar type equipment will be acceptable).

1. Waterproof covering shall be applied in a watertight manner and securely tied at the end of each working day.
2. Use of the manufacturer's product protection wrapping is not acceptable for work site protection, and if required to prevent moisture accumulation, the wrapping shall be side- or end-punctured or slashed before covering.
3. No tears in the waterproof coverings will be permitted.

### D. Materials shall carry appropriate Underwriters Laboratories (UL) classification labels when delivered to the work site.

## 1.7 GUARANTEE/WARRANTY

### A. System applicator shall furnish a single-ply membrane manufacturer's warranty to owner, in duplicate, filled out properly and signed by duly authorized officer, stating that all material and workmanship for single-ply membrane roofing system will be free from defects of material and

workmanship of any kind and shall make repairs and/or replacement at no cost to owner for a period of not less than fifteen (15) years from date of final acceptance by owner and/or final inspection by system manufacturer. Also provide manufacturer's twenty (20) year material warranty. Submittals shall be within two (2) weeks after roofing completion.

- B. In addition to the system manufacturer's warranty and material warranty, roofing contractor shall guarantee the new carpentry work, roof insulation, and all new sheet metal work for a period of not less than two (2) years from date of final acceptance by owner, against any failures associated with the entire roofing system and shall make repairs and/or replacement at no cost to owner during this guarantee period. This supplemental guarantee shall be submitted in writing to owner. Refer to form shown in Section 01750.
  - 1. Before final payment by owner, contractor shall submit system manufacturer's warranties and his guarantee to the architect/engineer.
- C. Repairs shall be made within 24 hours of notification.

## 1.8 FIELD DOCUMENTS

- A. Roofing superintendent or supervisor shall have a copy of this specification and pertinent drawings at work site.

## PART 2 - PRODUCTS

### 2.1 ROOF MEMBRANE MATERIALS

- A. Single-Ply Roofing Membrane:
  - 1. Single-ply roofing membrane shall consist of 0.060 inch (60 mil) thick calendared ethylene propylene diene monomer (EPDM).
    - a. Reinforced EPDM on slopes  $\frac{1}{2}$  inch per foot or greater.
    - b. The membrane thickness tolerance shall be between 0.054" and 0.066" for 60 mil (measured in accordance with ASTM:D412).
    - c. Membrane shall be factory-fabricated in single sheet material measuring not less than ten (10) feet wide by one hundred (100) feet long or the longest sheet possible as determined by job conditions.
    - d. Rolls of single-ply membrane with factory defects such as creases, stretch marks, out of square, etc., will be rejected.
  - 2. The membrane shall meet or exceed all requirements of ASTM:D4637, Standard Specification for EPDM sheet used in single-ply roofing membrane.
  - 3. Approved Manufacturers:
    - a. Firestone Building Product Co., Carmel, IN
    - b. Carlisle SynTec Systems, Carlisle, PA
    - c. Approved Equal
- B. Roof Vapor Retarder: Self adhering modified asphalt vapor retarder, V Force by Firestone, or 725 TR by Carlisle or approved equal.
- C. Related Materials:
  - 1. Related materials for the above single-ply membrane roofing system shall consist of the following or as recommended by the membrane manufacturer.
    - a. Membrane flashing shall be 0.060 inch (60 mil) thick uncured EPDM.
    - b. Bonding adhesive, splice cleaner, seam tape, "water cut-off mastic", molded pipe flashing, pourable sealer, reinforced universal securement system and all other related materials shall be compatible with materials with which it is to be used and shall be furnished by membrane manufacturer.

## 2.2 INSULATION MATERIALS

- A. Insulation to be of the type listed here.
- B. Tapered Rigid Board (Tapered Roof System)
1. Perlite roof insulation is to conform to ASTM: C728. Insulation is to be supplied in 2' x 4' boards.
  2. Thickness to be as shown on detail drawings.
  3. Approved Products
    - a. Fesco Board<sup>®</sup> as manufactured by Johns Manville or approved equal.
    - b. Approved Equal
- C. Rigid Board (Top Layer - Single-ply Roof System)
1. High density wood fiberboard insulation material conforming to ASTM: C208, Type II, Grade 2. Insulation to be supplied in 2' x 4' boards, and ½" thick minimum.
  2. Thickness to be as shown on detail drawings.
  3. Approved Products
    - a. Carlisle Sure Seal HP Recovery Board<sup>®</sup>
    - b. Firestone Fibertop<sup>®</sup>
    - c. Approved Equal
- D. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces, maximum board thickness of 2 inches.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Atlas Roofing Corporation.
    - b. Carlisle SynTec Incorporated.
    - c. Firestone Building Products.
    - d. GAF Materials Corporation.
    - e. Hunter Panels.
    - f. Insulfoam LLC; a Carlisle company.
    - g. Johns Manville.
    - h. Rmax, Inc.
- E. Substrate Board: ASTM C 1177, glass-mat, water-resistant gypsum substrate, Type X, ½" inch thick.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Georgia-Pacific Corporation; Dens Deck Prime.
    - b. USG Corporation; Securock Glass Mat Roof Board.
- F. Means of Attachment of substrate board:
1. Screw-and-Plate
    - a. Corrosion-resistant, self-tapping, self-drilling screw with low profile head. Fasteners to be carbon steel with corrosion resistant container. Fastener shall show no more than 10% red rust corrosion after 30 cycles or Kesternich testing.
    - b. Corrosion-resistant, factory-made plate.
    - c. Screw-and-plate type fastener to be Factory Mutual approved.
    - d. Approved Products:
      - 1) Glasfast by Owens Corning
      - 2) Roof Grip by Buildex
      - 3) Insulation Fastener by Olympic
      - 4) Dekfast by Construction Fasteners

- e. Fasteners to be of sufficient length to penetrate deck by  $\frac{3}{4}$ " and obtain an uplift resistance to conform to FM 1-90 requirements.
- G. Means of attachment of Insulation boards, other than the substrate board: Polyurethane adhesive, ISO by Firestone, FAST by Carlisle, or approved equal.

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- A. Owner will observe the roof installation. Contractor shall give owner's construction representative one (1) week written notice in advance of starting roofing installation.

#### 3.2 JOB CONDITIONS

A. Protection:

1. Existing work shall be properly protected from damage or soiling during the process of removal of existing roofing and installation of new roofing material. Exercise special care at openings through roof and at roof edges. Spill no roofing materials on existing building surfaces. Any finished work damaged in the execution of work under this section, including lawns/shrubbery, shall be replaced or restored to the original condition by this contractor.
2. Contractor shall protect existing roofing that is not scheduled to be removed with minimum  $\frac{3}{4}$  inch thick plywood protection board. Any damage to existing roof shall be repaired by contractor.

B. Workmanship:

1. Roofing work shall be accomplished with mechanics thoroughly skilled in the application of specified materials with workmanship to be done in such manner as to fulfill the requirements of drawings and specifications. Any specific directions furnished by the manufacturer regarding the application of his materials shall be strictly followed.
2. After starting work, contractor is responsible for complete moisture integrity of the roofing and flashing membrane, checking work installed on the roof and for providing properly applied roof which will insure or maintain the integrity of the specified roofing guarantee/warranty. Therefore, this contractor shall:
  - a. Not apply insulation or membrane under any conditions not suitable for the re-roofing work.
  - b. Exercise care to ensure adequate quantities of materials are used.
  - c. Maintain competent supervisor continuously supervising the work, with authority to discard unsuitable materials or remove unsatisfactory workers.
  - d. Observe all precautions involving the storage and handling of roofing materials. Provide adequate amount of fire extinguishers at work site.
3. The following precautions shall be followed when applying the single-ply membrane system:
  - a. Do not use oil base or plastic roof cement.
  - b. Do not allow waste products (petroleum grease, oil, solvents, vegetable or mineral oil, animal fat) or direct steam venting to come in contact with roofing systems.
  - c. Do not expose membrane or accessories to a constant temperature in excess of 180 degrees F.
  - d. Cements and bonding adhesives contain petroleum distillates and are extremely flammable. Do not breathe vapors or use near fire.
  - e. Splice wash used in the splicing procedure is extremely flammable; do not use near fire or flame or in a confined or unventilated area. Dispense only from a UL listed or approved safety can.

- f. Splicing and bonding surfaces shall be dry and clean.

### 3.3 REMOVAL OF EXISTING ROOF(S)

- A. Wherever re-roofing is indicated on drawings, the existing roofing membrane, roof insulation, and vapor retarder (if present) shall be removed to the roof decking and shall include but not be limited to, all flashings at walls, curbs, edge flashings and all other items incorporated therein.
- B. No more roof shall be removed than can be replaced and kept watertight in any working day.
- C. Clean surfaces of all loose material and other impediments that will be detrimental to application of new roofing materials.
- D. All debris from roofing removal shall be removed from roof immediately and deposited into containers to be removed from the premises at contractor's expense. No stockpiling of debris shall be permitted.
- E. Contractor shall clean up the roof and be responsible for keeping the roof and surrounding area in a neat and orderly condition.

### 3.4 PREPARATION OF SURFACES AND MATERIALS

- A. Roofing shall not start until roof surfaces are perfectly dry, firm, reasonably smooth, clean and free from dirt and foreign material. Deck shall be swept and/or vacuumed immediately before application.
- B. Under no conditions shall any roofing materials be applied before sunrise, or at any time when there are indications of moisture present (rain, mist, dew, frost or snow).

### 3.5 INSTALLATION OF INSULATION

- A. Prior to installation of insulation, all surfaces shall be thoroughly examined, and all defects shall then be repaired in a manner acceptable to the architect/engineer.
- B. No more insulation shall be laid at any one time than can be completely covered with single-ply membrane on same day.
  - 1. Insulation which has damaged edges or has become broken, gouged or has similar defects, will not be allowed in the completed work.
  - 2. Small pieces (less than 1 square foot) used to fill open joints or voids will be rejected and new insulation panels shall be installed to compensate for such joints or voids.
- C. Roof insulation shall be installed with all joints staggered one-half the length of insulation panels. All insulation shall be neatly cut with edges or joints of insulation tightly butted and not less than 1/4 inch gap at edges and penetrations.
- D. All layers of insulation, except substrate board, to be set in adhesive with all joints staggered and tightly butted following manufacturer's instructions. Insulation board to be cut to fit tightly around projections.
- E. Fasten substrate board with screws and plates installed at a rate of one per two square feet.

### 3.6 INSTALLATION OF VAPOR RETARDER

- A. Prime substrate. Install a single layer of self-adhering vapor retarder over the entire roof area and vertically at perimeters and penetrations with 3" side laps and 6" end laps.

### 3.7 INSTALLATION OF SINGLE-PLY ROOFING MEMBRANE

A. General:

1. After insulation has been properly installed, checked for defects and cleaned, contractor shall install single-ply roofing membrane sheets in a straight smooth line without curving. Position adjoining sheets lapping edges a minimum of 3 inches and in such manner that direction of water flow is over and not against laps. Field laps shall form a watertight seal.
  - a. At end of each day's work, a temporary water tie-off shall be applied and be removed cleanly when work is resumed.
  - b. If temporary water tie-offs are left for two days time, contractor shall check them daily for breaks and if any are found, repairs shall be made immediately.

B. Perimeter Termination Strip:

1. Reinforced securement strip shall be provided at the perimeter of each roof level, roof section, curb flashing, expansion joint and similar penetrations. Termination strips shall be mechanically fastened as detailed or recommended by membrane manufacturer using approved fasteners.
  - a. Top of mechanical fasteners shall be set flush with the top surface of the plate. Space mechanical fasteners a maximum of 12 inches on center.
2. Scuppers will be sumped. Refer to detail drawings.

C. Membrane:

1. Over the insulation, install roofing membrane as follows:
  - a. Install EPDM membrane loose-laid over surface of insulation and allow to relax for a minimum of 30 minutes.
  - b. After membrane has been allowed to suitably relax, fold sheet back approximately 50%. Sheet fold shall be smooth and without wrinkles.
  - c. Apply bonding adhesive to surface of insulation and membrane evenly with no puddles or globs.
    - 1) Note: If spray applying, all adhesive material must be back-rolled.
    - 2) Note: Field adhesive must not be applied to seam area.
  - d. Roll coated sheet into coated insulation surface with no wrinkles.
    - 1) Note: Any wrinkles larger than 12" in length will be cut out and repaired, no exceptions.
  - e. Sheet section will be "embedded" to achieve 100% contact.

D. Membrane Splicing:

1. Fold top sheet back and remove dirt and dust by brooming or wiping with clean rag. Clean both of the dry mating surfaces at the splicing area using clean natural fiber rags or natural sponges with "splice cleaner."
2. Apply seam tape in accordance with manufactures specifications. Seam tape shall be exposed 1/8" - 1/2" along length of splice. If exposed more than 1/2", apply 6" wide self adhering splice tape, centered over exposed seam.
3. Roll top sheet toward splice area along the entire length of splice. Allow sheet to fall freely into place. Avoid stretching and wrinkling, while brushing by hand toward the splice edge.
4. Roll splice with a two inch wide steel roller, using positive pressure, toward the outer edge of the splice.

### 3.8 INSTALLATION OF FLASHING

#### A. General:

1. Perimeter flashing, including curbs shall consist of 0.060 inch (60 mil.) thick EPDM flashing material using the longest pieces practical. All flashings and terminations shall be completed in accordance with manufacturer's recommendations.

#### B. Penetrations:

1. Flash all penetrations (pipes, conduits, vents, etc.) through the membrane.
  - a. Flash pipe with molded pipe flashings where possible.
  - b. Where molded pipe flashings cannot be installed, use field- fabricated pipe seals.

### 3.9 METAL COUNTERFLASHING

- A. Install metal counterflashing as per detail drawings. Refer to Section 076200.

### 3.10 INSPECTION PROCEDURES

- A. After re-roofing has been completed, this contractor shall if directed, cut out samples from roof, at places directed by architect/engineer and in his presence for the purpose of inspection. All cuts shall be sealed in plastic bags immediately after removal from roof, and taken to a testing laboratory for complete analysis. The contractor shall then fill in space cut out with insulation and membrane according to the original specifications.
- B. If roof membrane is found, as determined by samples cut out, to be inferior to that specified or to contain less material than is specified or otherwise not in conformity with specifications, the roofing shall be removed and replaced with work which is in accordance with this specification.
- C. Any costs for testing and/or necessary re-testing are to be borne by roofing contractor.

### 3.11 CLEAN UP

- A. Upon completion of the work, remove all excess material, debris, or trash resulting from this work. Leave completed surfaces clean and free from any defects of material or workmanship.
- B. Leave building and work site in a neat, clean and undamaged condition.
- C. Clean both interior and exterior surfaces which were soiled due to the work of this section.
- D. Repair or replace any damaged landscaping or improvements to original condition.

END OF SECTION 075323