

## **SECTION 075323**

### **ADHERED EPDM ROOFING SYSTEM**

#### **PART 1 GENERAL**

##### **1.01 RELATED WORK SPECIFIED ELSEWHERE**

- A. Restricted Work Period: Section 011000.
- B. Wood Nailers and Blocking: Section 061053.
- C. Flashing and Trim: Section 076000.

##### **1.02 DEFINITIONS**

- A. Company Field Advisor; An individual meeting the requirements of either subparagraph below:
  - 1. An employee of the company producing or manufacturing the system (or the company which lists and markets the primary components of the system under their name) who is certified in writing by the company to be technically qualified in design, installation, and servicing of the required products, and has experience in the installation of the required products. Personnel involved solely in sales do not qualify. Employees of the Contractor or the Subcontractor do not qualify.
  - 2. An individual employed by an organization (other than the company producing or manufacturing the system), certified in writing by the company producing or manufacturing the system, that the individual is technically qualified in design, installation and servicing of the required products and is capable to act as company field advisor in their behalf, and has experience in the installation of the required products. Personnel involved solely in sales do not qualify. Employees of the Contractor or the Subcontractor do not qualify.

##### **1.03 SYSTEM DESCRIPTION**

- A. Type B Adhered EPDM System: EPDM fully adhered to bonding adhesive, and the insulation and/or underlayment board bonded together and to the substrate with adhesive.

##### **1.04 SUBMITTALS**

- A. Waiver Of Submittals:
  - 1. "Named Brand" Roofing Systems: The "Waiver Of Certain Submittal Requirements" in Section 013300 applies to this Section only if a "Named Brand" roofing system is furnished.
  - 2. "Or Equal" Roofing Systems: The "Waiver Of Certain Submittal Requirements" in Section 013300 does not apply to this Section if an "or equal" is submitted.

- B. “Named Brand” Submittals: Submit for approval, one of the “named brand” roofing systems and any proposed deviations from the Contract Documents. Submit Product Data, Samples, Applicator’s Certification, and Material’s Certification, to the Director’s Representative at the site for information purposes only.
- C. “Or Equal” Submittals: Submit for approval, product data, samples, quality control submittals, and any proposed deviations from the Contract Documents.
- D. Approvals: Approval of a “named brand” or “or equal” roofing system is with the understanding that the requirements of the Contract Documents will be met. Approval of a roofing system does not constitute blanket approval of the manufacturer’s installation specifications or details.
  - 1. If the requirements of the Contract Documents differ from or are more stringent than the requirements of the approved roof system manufacturer, the Contract Documents have precedence over the requirements of the approved manufacturer.
- E. Proposed Deviations from the Contract Documents: Submit for approval proposed deviations when the roofing system is submitted. Proposed deviations submitted after the roofing system has been approved will not be considered for approval and may be cause for rejection of the previously approved roofing system.
  - 1. Manufacturer’s Details: Do not use or submit manufacturer’s standard details unless there is an omission or a proposed deviation from the Contract Documents. In such instances, submit the revised detail for approval. Label each revised detail with the words “PROPOSED DEVIATION”.
  - 2. Manufacturer’s Specifications and Installation Instructions: When there is a proposed deviation from the Contract Documents, submit the proposed deviation for approval. Label each specification and instruction revision with the words “PROPOSED DEVIATION”.
- F. Product Data: Catalog sheets, specifications, installation instructions for each material specified.
- G. Samples:
  - 1. Sheet Membrane: One 6 inch square piece.
  - 2. Sheet Flashing: One 6 inch square piece.
  - 3. EPDM Cover Tape: One 12 inch square piece.
  - 4. Inseam Tape: One piece 3 inches wide by 12 inches long.
  - 5. Fasteners: Two each type.
  - 6. Insulation: One 3 inch square piece.
  - 7. Coverboard: One 3 inch square piece.
  - 8. Self-Adhesive Vapor Retarder: One 6 inch square piece.
- H. Quality Control Submittals:
  - 1. Fire Hazard Certification: Written certification that the roof system, including the specific insulation, has been tested in conjunction with the type of structural roof deck and roof slope applicable to the project and

has achieved an Underwriters Laboratories Class A external fire resistance rating.

- a. Acceptable Certification: Letter from Underwriters Laboratories, or a copy of the Underwriters Laboratories classification listing for the roofing system.
  2. Wind Uplift Certification: Submit written certification that the roof system, including the specific insulation and fasteners, has been tested in conjunction with the type of structural roof deck applicable to this project, and has achieved a Factory Mutual Class 1-120 Wind Uplift rating.
    - a. Acceptable Certification: Letter from Factory Mutual, or a copy of the Factory Mutual Approval Report for the roofing system.
  3. Material Certification: Written certification from the roofing membrane manufacturer certifying that the insulation, insulation fasteners (if any), flashings and accessory products provided by the membrane manufacturer are approved for use with the roofing system and is included in the full system warranty.
  4. Membrane Manufacturer's Certification:
    - a. Written certification that the manufacturer has been actively marketing the submitted system for the past 5 years.
    - b. Names and addresses of 5 previous EPDM roofing projects installed within the past 5 years. Include the type and size of each project, and name and telephone number of a contact person at the project locations.
  5. Installer's Certification:
    - a. Written certification from the membrane manufacturer certifying that the installer is licensed or approved to install the roof system.
    - b. Names, addresses, and telephone numbers of 3 buildings where the installer has installed EPDM sheet membrane roof systems that have had the manufacturer's warranty issued. Include the types of EPDM systems installed, the manufacturer's names, and the warranty numbers.
    - c. Written certification that the job supervisor or crew chief and at least one other member of the roofing crew have installed at least 3 EPDM sheet membrane roof systems and are thoroughly familiar with all aspects of the installation.
  6. Warranty: Sample copy of the full system warranty specified.
- I. Contract Closeout Submittals:
1. Warranty: Warranties as specified.
- J. Material Safety Data Sheets (MSDS): Do not include the MSDS in the Submittals Package. Submit the MSDS to the Director's Representative at the Pre-Installation Conference.
- K. Submit all items, except contract closeout submittals and MSDS, at one time as a complete package. Partial submittals will not be considered.

## **1.05 QUALITY ASSURANCE**

- A. Fire Hazard Classification: The sheet membrane roof system shall have an Underwriters Laboratories Class A External Fire Resistance rating, as determined by tests conducted in conformity with UL-790 “Tests for Fire Resistance of Roof Covering Materials”.
  - 1. The roof system, which includes a specific generic type of insulation, and in some instances a specific name brand insulation, shall have been tested in conjunction with the type of structural roof deck and roof slope applicable to the project.
- B. Material Classification Identification: Materials delivered to the site that are a component of the roofing system shall bear the UL Classification mark.
- C. Membrane Manufacturer’s Qualifications:
  - 1. The manufacturer shall have been actively marketing an EPDM roof system in the United States for a minimum of 5 years.
  - 2. The manufacturer shall have the technical expertise and qualified technical representatives to resolve questions or problems that may arise both during and after the Work is completed.
  - 3. The manufacturer shall furnish the names, addresses, and telephone numbers of at least 5 previous projects of comparable size, scope, and complexity as the Work of this Section.
  - 4. The manufacturer shall require that the roof system be installed by a licensed or approved applicator.
- D. Installer’s Qualifications: The installation of the roofing system shall be performed by an installer licensed or approved by the membrane manufacturer. The installer shall have previously installed at least 5 EPDM sheet membrane systems for which the manufacturer’s warranty was issued. The roofing company shall, upon request, provide evidence of having a minimum of ten years of successful experience installing single-ply roofing systems and having installed at least ten roofing applications of equal size and scope.
  - 1. Workers: The supervisor or crew chief and at least one other member of the roofing crew shall have installed at least 5 EPDM sheet membrane roof systems and shall be thoroughly familiar with all aspects of the installation.
- E. Pre-Installation Conference: Before the roofing work is scheduled to commence, a conference will be called by the Director’s Representative at the site for the purpose of reviewing the Drawings and the Specifications and discussing requirements for the Work. The conference shall be attended by the Contractor, the authorized roofing applicator, and the Company Field Advisor.

## **1.06 ROOFING MANUFACTURER’S COMPANY FIELD ADVISOR**

- A. The manufacturer of the roofing system, issuing the final system guarantee on this roofing project, must supply a Company Field Advisor, as a technical representative, with the following minimum qualifications:
  - 1. Documentation of 5 years of field experience on the same type of roofing system.

2. Documentation of 5 projects where role was a Company Field Advisor; include contact names and phone numbers for each project.
  3. Documentation of attendance at a roof specific instructional seminar within the last two years.
- B. Company Field Advisor Duties and Responsibilities:
1. Become familiar with the Contract Documents and approved submittals prior to the pre-roofing conference.
  2. Attend the pre-roofing conference and the beginning of the actual membrane installation for the purpose of:
    - a. Rendering technical assistance to the Contractor regarding installation procedures of the system.
    - b. Familiarizing the Director's Representative with all aspects of the system including inspection techniques.
    - c. Answering questions that might arise.
  3. Attend each bi-weekly meeting.
  4. Be objective, unbiased and impartial in each inspection, recommendation, conversation, action and written report.
    - a. Inspect the existing substrate, flashing, blocking, and related materials as being acceptable for the installation of the roofing system.
    - b. Ensure proper fastening patterns and fastener sizes of wood blocking, insulation, edge flashing, and related components.
  5. Immediately report non-compliant conditions, if any, to the Director's Representative.
  6. Provide to the Director's Representative a written report, submitted prior to leaving the Project Site each day the Company Field Advisor is present. Each daily written report shall contain at a minimum:
    - a. Date of report and inspection.
    - b. Weather conditions at the start, middle, and end of the work day.
    - c. Work performed including Contractor activity, contractor crew size, supervisor's name, area of activity, and progress and quality of the work as observed.
    - d. Discussions with Contractor regarding work anomalies and resolution.
    - e. Conditions that are not in compliance with the Contract documents.
      - 1) Continue documenting non-compliance issues in subsequent reports until the issue has been resolved.
      - Document resolution of non-compliance issues when resolved.
  7. Report to the Director's Representative in writing failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
  8. Confirm, after completion of the roofing work and based on the Company Field Advisor's inspections and tests, that the Company Field Advisor has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Delivery: Deliver materials to the site in the manufacturer's labeled, unbroken containers.
- B. Storage and Handling: Store materials in a dry, well-ventilated place protected from the weather.
  - 1. Do not store materials so as to overload the deck or structural assembly.
  - 2. Store all materials on raised platforms covered with properly secured breathable water resistant covers. Slit shrink wrapping to not permit condensation and cover with breathable tarp.
  - 3. Remove all materials that become wet from the site.
  - 4. Store volatile liquids in a separate storage building or trailer, or removed from the site at the end of each workday.
    - a. Store volatile liquids at temperatures recommended by the manufacturer.
  - 5. Do not remove materials from factory packaging until ready for use.
  - 6. Store adhesives, and sealants at temperatures between 60 degrees F and 80 degrees F.

## **1.08 PROJECT CONDITIONS**

- A. Unless otherwise directed, do not execute the work of this Section if the Director's Representative is not present.
- B. Do not execute the work of this Section unless the substrate is dry and free of dirt and debris.
- C. Moisture Protection:
  - 1. Cover, seal or otherwise protect the roof and flashings so that water cannot accumulate or flow under completed portions. When and where necessary to accomplish this, provide temporary water cut-offs in accordance with the membrane manufacturer's written specifications.
  - 2. Limit the removal of existing materials to areas that can be completely re-roofed or temporarily protected within the same day. At the discretion of the Director's Representative, a watertight built-up vapor retarder may be acceptable temporary protection for a maximum of 48 hours.
- D. Do not smoke or use open flames near volatile materials.

## **1.09 WARRANTY**

- A. Warranty Extension: The one year period required by Paragraph 9.8 of the General Conditions is extended to 2 years for the Work of this Section. Refer to Supplementary Conditions.
- B. Manufacturer's Warranty: In addition to the 2 year period specified above, furnish the membrane manufacturer's printed 30 Year Full System Warranty, covering workmanship, materials, and wind related damage, for the Work of this Section.

1. The warranty shall include, but not be limited to, repair of leakage and the repair and/or replacement of the roofing system as necessary to correct defects or damage caused by; materials, workmanship, or wind speeds less than 90 MPH.
  - a. Materials shall include the membrane, insulation, fasteners, adhesives and tapes, flashing originally provided by the manufacturer, and all accessory products.
  - b. Repair and/or replacement of the roofing system shall include the replacement of wet insulation. For the purpose of this specification, insulation will be considered wet if either of the following exists:
    - 1) Free water is visible when the insulation is compressed.
    - 2) No free water is visible when the insulation is compressed, but the insulation is damp to the touch over a large enough area, as determined by the Director's Representative, to jeopardize the integrity of the roof system and any of its components, or to significantly lower the specified R value of the insulation.

## **PART 2 PRODUCTS**

### **2.01 EPDM SHEET MEMBRANE, SHEET FLASHING, AND RELATED PRODUCTS**

- A. The EPDM sheet membrane shall be visually free of streaks, particles of foreign matter, undispersed raw material, pinholes, cracks, tears, and shall be uniform in thickness. When unrolled in a relaxed position, the membrane shall be free of wrinkles, distortions, and blisters.
- B. EPDM (Ethylene, Propylene, Diene, Monomer) Sheet Membrane:
  1. One of the following types as required to achieve a UL Class A external fire rating for the slope of the roof system:
    - a. 90 mil, unreinforced, EPDM membrane.
  2. The following systems are listed in the UL Materials Directory as having a UL Class A Exterior Fire Rating when installed with the type of deck, insulation, and roof slope applicable to this Project.
    - a. "Sure Seal Adhered Roofing System" by Carlisle Syntec Systems, P.O. Box 7000, Carlisle, PA 17013, (800) 479-6832, [www.carlisle-syntec.com](http://www.carlisle-syntec.com)
    - b. "Adhered Rubbergard Platinum" by Firestone Building Products Company, 525 Congressional Blvd., Carmel, IN 46032, (800) 428-4442, [www.firestonebpco.com](http://www.firestonebpco.com)
    - c. "UltraGuard Adhered Roofing System" by Manville Roofing Systems, P.O. Box 5108, Denver, CO 80217-5108, (800) 654-3103, [www.jm.com](http://www.jm.com)
    - d. "VersiGard Fully Adhered Roofing System" by Versico Incorporated, P.O. Box 6424, Akron, OH 44312, (800) 992-7663, [www.versico.com](http://www.versico.com)

- C. Sheet Flashing: Membrane manufacturer's cured and uncured EPDM as specified.
- D. Inseam Tape: Membrane manufacturer's minimum 6 inch wide self adhering tape consisting of cured butyl double sided adhesive tape, for inseam splicing of rubber to rubber.
- E. Cured EPDM Cover Tape: Membrane manufacturer's minimum 6 inch wide self adhering tape consisting of cured butyl adhesive laminated to cured EPDM, for installation over EPDM seams, cuts in field membrane, and for stripping in metal work.
- F. Uncured EPDM Cover Tape: Membrane manufacturer's minimum 6 inch wide self adhesive tape, consisting of, cured butyl adhesive laminated to uncured EPDM, for installation over base flashing corners, inside and outside corners, pipe flashings and other detail work.
- G. Related Products: Membrane manufacturer's bonding adhesive, splicing cement, lap sealant, water cut-off mastic, nite seal, pourable sealer, splice joint cleaning agent and primer, insulation adhesive, and all other products related to the sheet membrane system. All adhesives, primers, and cleaners must comply with the current New York State VOC OTC regulations.

## 2.02 INSULATION

- A. The total insulation thermal resistance averaged over the entire roof area shall produce an R-30.
- B. The indicated insulation thickness is nominal, allowing for differences in insulating properties of various name brands. Minor variation in thickness is acceptable, provided the specified thermal value and other requirements of this Contract are met.
- C. Approval of the insulation is contingent upon certification by the membrane manufacturer that the insulation is approved for use with the specified roof system and that the insulation is included in the full system warranty specified.
- D. Uniform Thickness isocyanurate insulation and Tapered isocyanurate insulation: Membrane manufacturers approved closed cell isocyanurate foam core insulation skinned on both sides with factory applied fiberglass facers suitable for installation with hot asphalt and cold adhesive. ASTM C1289-02, Type II, Class 1, Grade 2. UL Classified and Factory Mutual Approved for direct application over steel deck. Minimum LTTR : 5.7 per inch thickness.
  - 1. Board Size:
    - a. Adhesively Secured Insulation: Maximum board size 4 feet x 4 feet.
- E. Tapered Insulation System: Membrane manufacturer's approved 1/4 inch per foot factory tapered polyisocyanurate insulation.

- F. Tapered Cricket System: Membrane manufacturer's approved 1/2 inch per foot factory tapered isocyanurate insulation conforming to ASTM C 1289.
- G. Tapered Edge Strips: Membrane manufacturer's approved 1/2 inch per foot factory tapered isocyanurate insulation conforming to ASTM C 1289.

## **2.03 COVERBOARD**

- A. Coverboard: 1/2 inch thick gypsum roof board composed of a silicone treated gypsum core with fiberglass facers.
  - 1. Acceptable Product: "Dens-Deck" by Georgia-Pacific Corporation, Gypsum Division, 133 Peachtree Street, N.E., Atlanta, GA 30303, (800) 225-6119, [www.gp.com](http://www.gp.com)
  - 2. Securock Roof Board, 3/8 inch thick by USG, 550 West Adams Street, Chicago, IL 60661-3676, (312)-0436-4000, [www.usg.com](http://www.usg.com).
  - 3. Adhesively Attached Coverboard: Maximum board size 4 feet x 4 feet.

## **2.04 FASTENERS**

- A. Membrane Fasteners: Approval of fasteners is contingent upon certification by the membrane manufacturer that the fasteners are approved for use with the specified roof system and that the fasteners are included in the full system warranty specified.
- B. Base Flashing Fasteners (use along top edge of base, beneath in-wall cap flashings):
  - 1. Concrete and/or Masonry Surfaces: Hardened masonry nails or zinc alloy hammer driven expansion anchors with stainless steel drive pins through 1 inch minimum sheet metal discs.
  - 2. Sheet Metal Surfaces: Hardened, self tapping, #10 sheet metal screws through 1 inch minimum sheet metal discs.
  - 3. Wood Surfaces: Hot dipped galvanized roofing nails with minimum 3/8 inch diameter head.
- C. Termination Bar and Fasteners:
  - 1. Termination Bar: Factory fabricated one inch wide x .098 inches thick mill finish extruded aluminum pre-punched 6" on center with a caulking and stiffening flange, as provided by the membrane manufacturer.
  - 2. Fasteners:
    - a. Concrete Or Masonry Surfaces: Slotted hex washer head masonry screws or zinc alloy hammer driven expansion anchors. Length as required to securely hold the compression bar tight against the wall surface.
    - b. Wood and Sheet Metal Surfaces: Hardened, self-tapping, slotted hex washer head screws.
- D. EPDM Anchor Strips: 6 inch wide reinforced EPDM.

## **2.05 INSULATION ADHESIVE**

- A. Coverboard, Insulation And Underlayment Board Adhesive:
  - 1. Two-part, low rise polyurethane foam adhesive, supplied by the membrane manufacturer to satisfy warranty requirements.
  - 2. One-part, solvent-free, moisture curing, cold fluid-applied, bituminous-urethane adhesive, supplied by the membrane manufacturer to satisfy warranty requirements.

## **2.06 MISCELLANEOUS MATERIALS**

- A. Pipe Flashing: Membrane manufacturer's cured pre-molded EPDM pipe boot.
- B. Compression Clamp (for factory fabricated flashings only): Stainless steel or cadmium plated steel worm drive clamp.
- C. Expansion Joint Tube: Compressible neoprene or polyethylene tube, twice the diameter of the width of the expansion joint.
- D. Walkway, Protection Pads: Manufacturer's nonporous, pressure sensitive, solid molded rubber walkway pads, 30 inch by 30 inch with factory rounded corners.
- E. Retro-Fit Roof Drains: Metal roof drains designed specifically for installation into an existing roof drain and conductor pipe. The drain shall be formed with an expandable drop tube or with an expandable rubber boot to form a watertight seal between the drop tube and the existing conductor pipe. The drain shall also have a large flashing flange, clamping ring and an aluminum strainer.
  - 1. Acceptable Products:
    - a. "Coppertight Roof Drain" by Marathon Roofing Products Inc. 367 Nagel Drive, Buffalo, NY, 14225-4732, (800) 828-8424, [www.marathondrains.com](http://www.marathondrains.com)
    - b. "RAC Insert Drain System" by OMG Inc., 153 Bowles Road, Agawam, MA, 01001 (800) 633-3800, [www.olyfast.com](http://www.olyfast.com)
    - c. "Portals Plus Reroof Drain" by Portals Plus, Inc., 639 N. Thomas Drive, Bensenville, IL 60106 (800) PPI-5240, [www.portalsplus.com](http://www.portalsplus.com)
    - d. Membrane manufacturer's standard insert drain.
- F. Roof Drain Membrane Clamping Collar: Universal cast iron membrane clamping collar and mounting hardware.
  - 1. Acceptable Products:
    - a. Universal Membrane Clamping Collar Model No. 1002 by Jay R. Smith Mfg. Co., P.O. Box 3237, Montgomery, AL 36109, 334-277-8520, [www.jrsmith.com](http://www.jrsmith.com)
    - b. Universal clamping ring, By Marathon Roofing Products Inc. 367 Nagel Drive, Buffalo, NY, 14225-4732, (800) 828-8424, [www.marathondrains.com](http://www.marathondrains.com)
- G. Pitch Pocket Filler Material:
  - 1. Mortar: ASTM C 270, Type S.

2. Elastomeric Cement: Non-sag, cold applied, trowel grade, single component rubber elastomer with minimum elongation of 400 percent, supplied by the membrane manufacturer to satisfy warranty requirements.
- H. Sealant: One-part, low modulus, silicone sealant: Dow Corning's 790, General Electric's Silpruf, Pecora's 864, or Tremco's TremPro 646.

## **2.07 WHITE ACRYLIC ELASTOMERIC COATING**

- A. Field applied acrylic elastomeric coating as recommended and approved by the membrane manufacturer.
1. Color: White.

## **2.08 MATERIALS FOR VAPOR RETARDER**

- A. Vapor retarder to have a minimum perm rating of 0.05 as per ASTM E96. Vapor retarder must be acceptable as a temporary roof and have a minimum 90 day exposure rating.
- B. Materials For Repair Of Existing Vapor Retarder:
1. Primer: Quick drying asphalt primer; ASTM D 41.
  2. Asphalt Fiberglass Base Sheet: Non porous asphalt coated glass fiber base sheet: ASTM 4601-98, Type IV.
  3. Plastic Roof Cement: Non-asbestos bearing, fibrated, flashing grade; ASTM D 4586.
  4. Bitumen: Steep asphalt; ASTM D 312, Type III.
  5. Interply Adhesive: Membrane manufacturer's cold process solvent based modified adhesive.
    - a. Asphalt content: 42 percent ASTM D 4479-93
    - b. Density: 8 lbs/gal ASTM D 1475-90
    - c. Asbestos content: None.
- C. Materials For Vapor Retarder Over Concrete Decks:
1. Primer: Quick drying asphalt primer; ASTM D 41.
  2. Bitumen: Steep asphalt; ASTM D 312, Type III.
  3. Interply Adhesive: Membrane manufacturer's cold process modified adhesive. Asphalt content: 42 percent ASTM D 4479-93.
  4. Asphalt Fiberglass Base Sheet: Non porous asphalt coated glass fiber base sheet: ASTM 4601-98, Type IV.
- F. Self-Adhering Vapor Retarder:
1. Composite membrane 40-mil thick, consisting of a minimum 32-mils of self-adhering rubberized asphalt laminated to an 8-mil polyester fabric, or 5 mil skid resistant polyethylene film conforming to ASTM D 412, ASTM D 146 and ASTM E-154.
    - a. Primer: Manufacturer's recommended primer.

## **PART 3 EXECUTION**

### **3.01 SURFACE PREPARATION**

- A. Ensure roof drain strainers are in place and secured during removal of insulation and other debris. Provide cast iron strainers where existing strainers are missing. Do not allow removal debris to enter drains.
- B. Cleaning: Before the roofing installation commences, sweep and/or vacuum all surfaces as required to remove all dirt, dust, loose aggregate, foreign matter, and debris left from removals of existing roofing.

### **3.02 PREPARATION**

- A. Testing Existing Roof Drains and Conductor Pipes: Before commencing with the Work of this Section, water test existing roof drains and conductor pipes and submit a written report to the Director's Representative indicating which drains or conductors, if any, are not functioning properly. Repair of existing drains and conductors is not included in the Work. Repair work (if any) may, at the Director's option, be accomplished by an Order on Contract.
- B. Patching Existing Vapor Retarder: Remove loose and/or deteriorated portions of the existing vapor retarder. Patch defective areas with fiberglass felt embedded in and coated with asphalt plastic roof cement. Extend the patch a minimum of 12 inches beyond the defect on all sides.

### **3.03 INSTALLING VAPOR RETARDER**

- A. Installing Self-Adhering Vapor Retarder on a Concrete or Gypsum Deck:
  - 1. Surfaces to receive the vapor retarder must be clean and dry. Broom clean and blow off the existing deck to remove debris and dust. Prime all surfaces to receive the vapor retarder with the membrane manufacturer's recommended primer. Apply primer with a long nap roller at the applicable coverage rate. At 75° F allow primer to dry 1 hour minimum. Primer has a satisfactory cure when it will not transfer when touched. Prime only the areas to be waterproofed the same day. Reprime if area becomes dirty. Apply the vapor retarder from low to high point, in a shingle fashion, so that laps will shed water. Overlap all edges at least 2-1/2 inches. End laps shall be staggered. Place membrane carefully so as to avoid wrinkles and fishmouths. Immediately after installation, roll with a 100-150 pound weighted steel roller. Lap seal all joints if used as a temporary roof.
- B. Extend the vapor retarder at curbs, walls, and wood blocking up to a height equal to the thickness of the insulation plus 4".
  - 1. Unless approved otherwise by the Director's Representative, follow immediately with the installation of the insulation and roofing membrane.

### **3.04 INSTALLING INSULATION**

- A. Keep insulation absolutely dry at all times. Discard insulation that contains moisture. Install the insulation in a minimum of two layers, top layer joints staggered and offset from the joints of the insulation below. Cut base layer of insulation to a 2 foot width as a starter. Butt edges and ends snugly so that there are no gaps between the insulation boards.
  - 1. Install only as much insulation as can be covered with roofing membrane the same day.
  - 2. Discard all units with broken corners or similar defects.
  - 3. At roof drains, terminate the insulation with tapered edge strips so that all flashing and coverstrip joint laps can be made within the tapered portion.
- B. Installing Insulation with Adhesive: Set each board in ribbons of insulation adhesive 6 inches on center and 4 inches on center at the perimeter and corners or as an alternative fully spray insulation adhesive over the entire roof area. Press insulation into the adhesive immediately and as necessary thereafter to assure proper bonding.
- C. Installing Tapered Insulation System: Set boards per manufacturer's layout in ribbons of insulation adhesive 6 inches on center and 4 inches on center at the perimeter and corners or as an alternative fully spray insulation adhesive over the entire roof area. Install each layer of insulation with joints staggered. Butt edges and ends snugly so that there are no gaps between the insulation boards. Press insulation into the adhesive immediately and as necessary thereafter to assure proper bonding.

### **3.05 INSTALLING COVERBOARD**

- A. Install coverboard over the insulation to provide protection from insulation facer delamination and to provide protection from foot traffic, etc. Stagger and offset joints of coverboard from the insulation below, staggering end joints. Butt edges and ends snugly.
- B. Installing Coverboard with Adhesive:
  - 1. Set each board in serpentine ribbons of adhesive applied at the rate of 6 inches on center. Press the board into the adhesive immediately and as necessary thereafter to assure proper bonding. Maintain pressure on the adhesive until the adhesive has completely set (20 to 45 minutes), or as per the Manufacturer's recommendations.

### **3.06 INSTALLING EPDM ROOF MEMBRANE**

- A. Install the membrane with the minimum number of field formed joints. Use the largest size factory formed sheets as is practicable.
  - 1. If possible start at high points of the roof and work towards the low points. Lap sheets so the flow of water is not against the edges of the sheet.
  - 2. Position the membrane so it is free of buckles or wrinkles. Do not stretch the membrane. Lay the sheets with a minimum 6-inch lap.

- a. When the edges of the EPDM sheet are not straight so that the inseam tape and cover tape can be applied without distortion, snap a chalk line on the edge of the top sheet and cut the sheet so that the edge is straight.
  3. Allow the membrane to relax for a minimum of 1/2 hour before securing or splicing. When installing membrane in cold weather, allow the membrane to relax for a longer period of time as recommended by the manufacturer.
- B. Adhering Roofing Membrane To The Substrate:
1. Adhere the roofing membrane to the substrate with the manufacturer's bonding adhesive. Mating surfaces must be clean and dry before adhering the membrane.
  2. Apply a uniform coating of bonding adhesive to both mating surfaces at the rate recommended by the manufacturer. Do not leave "skips" or "holidays". Do not allow the bonding adhesive to puddle.
  3. Do not allow bonding adhesive to come in contact with areas to be spliced.
  4. Allow the adhesive to dry until it does not stick to the dry finger touch. Do not attempt to adhere the membrane if the bonding adhesive is wet to the touch.
  5. Adhere the membrane to the substrate so it is free of wrinkles, fishmouths, or voids.
  6. Broom the membrane to achieve maximum adhesion. Do not try to reposition the sheet once it has been adhered to the substrate.
- C. Splicing EPDM Roof Membrane Lap Joints:
1. Splice side and end lap joints of the sheet membrane with the manufacturer's inseam splicing tape and seam cover tape. Do not use splicing cement.
  2. Mark the bottom sheet along the edge of the top sheet with a marking crayon.
  3. Cleaning and Preparing The Lap Joint:
    - a. Remove dirt and dust. Detergent-wash the splice area where dirt has adhered to the membrane. Rinse with clean water and allow to dry thoroughly.
    - b. Solvent wash surfaces that will be in contact with inseam tape and cover tape with natural fiber rags soaked in the manufacturer's recommended cleaning agent. Clean the splice area until the sheet is clean and black, with no streaks, and there is no trace of talc or foreign matter left in the splice area. Change rags frequently to avoid spreading the talc or dirt.
    - c. The solvent wash is mandatory and cannot be eliminated regardless of the manufacturer's requirements.
  4. Installing Inseam Splicing Tape:
    - a. Apply the manufacturer's primer to surfaces that will be in contact with the inseam tape. Allow the primer to dry completely before completing the splice.
    - b. Position the tape on the bottom sheet with the edge aligned with the previously made markings. Roll the surface of the tape to insure good adhesion.

- c. Fold the top sheet over the tape. Trim the sheet as necessary so that 1/4-inch of the tape is exposed.
  - d. Remove the release paper from the top surface of the tape and allow the membrane to come in contact with the tape as the paper is being removed.
  - e. Roll the surface of the splice to insure good adhesion.
- 5. Installing Cover Tape:
  - a. Apply the manufacturer's primer to surfaces that will be in contact with the cover tape. Allow the primer to dry completely before completing the splice.
  - b. Apply the cover tape centered over the seam. Roll the tape into position while the release paper is being removed.
  - c. Adhere the tape to the underlying sheet so it is free of wrinkles, fishmouths and voids.
  - d. Roll the surface of the splice to insure good adhesion.
- D. Securing EPDM Roof Membrane At Base Of Walls and Sloped Intersections:
  - 1. At base of walls, and at sloped intersections with inclines greater than 2 inches to the foot, turn the EPDM roofing membrane up onto the vertical surface so that it is self flashing.
  - 2. Before turning the membrane up onto the vertical or inclined surface, install a minimum 6 inch wide reinforced EPDM membrane strip over the roof insulation. Fully adhere the strip to the insulation with bonding adhesive. Mechanically fasten the strip thru the insulation to the structural deck or to the base of the wall as shown on the Contract Drawings with screws and stress plates one foot on center.
    - a. Adhere the roof membrane to the EPDM strip with splicing cement.
  - 3. Work the membrane into the intersection of the deck and the vertical or inclined surface so that there is no bridging. Adhere the membrane to the vertical or inclined surface with bonding adhesive.
  - 4. If wrinkles or loose membrane develop on the vertical surface, cut the membrane so that it will lay flat and tight to the surface. Adhere a one-foot wide patch of EPDM over the cut membrane.
    - a. Apply lap sealant around the perimeter of the patch.
- E. Sealing "T" Joints In The EPDM Roof Membrane:
  - 1. Where two spliced seams ("T" joints) running perpendicular or on a bias to each other intersect, apply lap sealant at the edges of the cover tape. Extend the lap sealant a minimum of 6 inches beyond each intersecting corner.

### **3.07 INSTALLING EPDM FLASHINGS**

- A. Splicing EPDM Flashing:
  - 1. Remove dirt and dust. Detergent wash mating surfaces where dirt has adhered to the membrane. Rinse with clean water and allow to dry thoroughly.
  - 2. Solvent wash mating surfaces with natural fiber rags soaked in the manufacturer's cleaning agent. Clean the splice area until the sheet is clean and black, with no streaks, and there is no trace of talc or foreign

matter left in the splice area. Change rags frequently to avoid spreading the talc or dirt.

- a. Brush-apply a uniform coating of splicing cement to both mating surfaces at the rate recommended by the manufacturer. Do not leave any “skips” or “holidays”. Do not allow the splicing cement to puddle.
- b. Allow the splicing cement to dry until it does not stick to the dry finger touch. Do not complete the splice if the splicing cement is wet.
- c. Adhere the top sheet to the underlying sheet so it is free of wrinkles, fishmouths, and voids.
- d. Roll the splice with a steel roller to insure good adhesion.
- e. Apply a bead of lap sealant along exposed edges and tool to a slightly convex surface. Lap sealant must be applied the same day the splice is completed.

B. Adhering EPDM Flashings To The Substrate:

1. Adhere the flashings to the substrate with the manufacturer’s bonding adhesive. Mating surfaces must be clean and dry and smooth before adhering the membrane. Do not adhere membrane directly to masonry surfaces.
2. Apply a uniform coating of bonding adhesive to both mating surfaces at the rate recommended by the manufacturer. Do not leave any “skips” or “holidays”. Do not allow the bonding adhesive to puddle.
3. Do not allow bonding adhesive to come in contact with areas to be spliced.
4. Allow the adhesive to dry until it does not stick to the dry finger touch. Do not attempt to adhere the flashing if the bonding adhesive is wet to the touch.
5. Adhere the flashing to the substrate so it is free of wrinkles, fishmouths, or voids.
6. Roll the surface of the flashings to achieve maximum adhesion. Do not try to reposition the flashing once it has been adhered to the substrate.

C. Installing EPDM Base Flashing At Equipment Curbs, Skylight Curbs, and At Walls Where The Roof Membrane Cannot Be Turned Up In One Piece:

1. Complete the splice between the sheet flashing and the roof membrane before bonding the flashing to vertical surfaces. Extend the splice a minimum of 3 inches beyond fastener plates that secure the membrane.
2. Apply bonding adhesive to the substrate. Roll the flashing into the bonding adhesive so there are no wrinkles and no bridging at the base of the flashing. Work the surface of the flashing to insure good adhesion.
3. At inside and outside corners cut and fold the membrane around the corner as recommended by the manufacturer. Apply uncured EPDM corner patches.
4. Apply lap sealant at edges and ends of the flashing.
5. If the base flashing terminates beneath a cap flashing, secure the top edge of the flashing with fasteners 12 inches on center.

- D. Installing EPDM Expansion Joint At Building Wall Base:
1. At the base of the wall, secure the roofing membrane to a reinforced EPDM membrane strip.
  2. Install a minimum 6 inch wide reinforced EPDM membrane strip over the insulation. Fully adhere the strip to the insulation with bonding adhesive. Mechanically fasten the strip to the structural deck with screws and stress plates one foot on center.
  3. Adhere the roof membrane to the EPDM strip with splicing cement.
  4. Install premolded joint filler or batt fiberglass insulation in the expansion joint. Install 2 inch round premolded expansion joint filler tube. Set the tube so that it extends above the roof surface at least 1-1/2 inches.
  5. Apply bonding adhesive to the wall surface. Extend the membrane over the tube and up the wall surface. Work the membrane into the bonding adhesive to insure good adhesion.
  6. If wrinkles or loose membrane develop on the vertical surface, cut the membrane so that it will lay flat and tight to the surface. Adhere a one-foot wide patch of EPDM over the cut membrane.
    - a. Apply lap sealant around the perimeter of the patch.
  7. Secure the top edge of the membrane with fasteners one foot on center.
- E. Installing EPDM Expansion Joint In Field Of Roof:
1. Install a minimum 6 inch wide reinforced EPDM membrane strip over the insulation on each side of the expansion joint. Fully adhere the strip to the insulation with bonding adhesive. Mechanically fasten the strip to the structural deck with screws and stress plates one foot on center.
  2. Install premolded joint filler or batt fiberglass insulation in the expansion joint. Install 2 inch round premolded expansion joint filler tube. Set the tube so that it extends above the roof surface at least 1-1/2 inches.
  3. Apply splicing cement to the membrane and the reinforced EPDM strips. Fold the membrane over the joint and splice the membrane to the strip. Roll the surface to insure good adhesion.
- F. Installing Termination Bar:
1. Where base flashing does not terminate beneath a cap flashing, seal the top edge as follows:
    - a. Set the top one-inch of the flashing in water cut off mastic.
    - b. Install a continuous metal termination bar over the flashing and secure one foot on center.
    - c. Apply a bead of lap sealant along the top edge.
- G. Installing Gravel Stop Flashing:
1. Install the gravel stop over the roofing membrane.
  2. Strip in the horizontal portion of the gravel stop with cover tape.
    - a. Apply the manufacturer's primer over the metal flange of the gravel stop and the roofing membrane before applying the cover tape.
    - b. Apply uncured EPDM cover tape or 6 inch x 6 inch uncured EPDM over "T" joints, at end laps, and at metal joints.
    - c. Apply lap sealant at metal joints and along cover tape edges and uncured EPDM patches.

- H. Installing Flashing At Snap On Cant Type Gravel Stops:
1. Install the canted water dam portion of the gravel stop over the roofing membrane.
  2. Strip in the water dam with one strip of sheet flashing set in splicing cement. Extend the flashing over the front edge of the water dam a minimum of 3 inches and out past the base of the cant a minimum of 3 inches. Apply lap sealant along the splice edge and at splice joints.
    - a. Install the fascia portion of the gravel stop.
- I. Installing Scupper Flashing:
1. Strip in flanges of the metal scupper with uncured EPDM covertape. Completely cover the metal flanges. Extend the flashing a minimum of 3 inches beyond the flanges onto the roofing membrane. Apply lap sealant at exposed edges.
- J. Installing Pipe Flashing:
1. Wherever possible flash pipes through the roof with the manufacturer's premolded pipe flashing.
    - a. Cut the flashing to the proper diameter. Apply splicing cement to the bottom of the flashing and to the contact surface of the membrane. Apply water cut-off mastic between the contact surface of the pipe and the flashing. Install the premolded flashing.
    - b. Install clamping ring around top of flashing. Apply lap sealant around the splice edge of the flashing flange.
  2. Where premolded pipe flashings cannot be used, use field fabricated uncured EPDM covertape flashing.
    - a. Apply the manufacturer's primer to surfaces that will be in contact with the cover tape. Allow the primer to dry completely before completing the flashing.
    - b. Install a square shaped piece of flashing over the membrane. Turn the flashing up onto the pipe 1/2 inch.
    - c. Wrap a second piece of flashing around the pipe. Extend the flashing 1/2 inch onto the horizontal portion of previously installed flashing.
    - d. Roll the surface of the splice to insure good adhesion.
    - e. Adhere the tape to the underlying sheet so it is free of wrinkles, fishmouths and voids.
    - f. Apply lap sealant at splice edges and at the top of the flashing.
- K. Installing Pitch Pockets:
1. Install the metal pitch pocket over the roofing membrane. Completely cover the pitch pocket with sheet flashing set in splicing cement. Turn down the flashing 1/2 inch into the pitch pocket and a minimum of 3 inches beyond the horizontal flanges of the pitch pocket. Seal edges and splice joints with lap sealant.
  2. Cover the bottom half of the pitch pocket with mortar. Remove misplaced mortar from the portion of the pitch pocket to be filled with elastomeric cement. Fill the remaining half of the pitch pocket with elastomeric cement.

- L. Flashing Retro Fit Roof Drains:
1. Before installing the retro fit drain, apply water cut off mastic on the bottom side of the drain flange.
  2. Prime the top surface of the drain flange and the roof membrane with the roof membrane manufacturer's primer.
  3. Strip in the drain flange with EPDM sheet membrane cover strips. Extend the cover strips from the edge of the conductor pipe cut out to a minimum of one foot beyond the drain flange onto the roof surface.
  4. Apply lap sealant at edges and lap joints of the coverstrips.
- M. Flashing New Cast Drains:
1. Apply the manufacturer's water cut-off mastic around the perimeter of the drain body in the location of the clamping ring. Embed the membrane into the mastic. Install the clamping ring and strainer.
- N. Flashing Existing Cast Drains:
1. Remove the existing clamping ring, coverstrips, and lead flashing. Clean the contact area of the drain body down to bare metal removing all traces of asphalt. Liberally apply the manufacturer's water cut-off mastic around the perimeter of the drain body in the location of the clamping ring. Embed the membrane into the mastic. Install the clamping ring and strainer.
    - a. Secure the clamping ring with new bolts to match the existing.
- O. Installing Roof Drain Clamping Collar: Remove the existing drain clamping ring and bolts. Check the cast parts of the drain body for high or rough edges; file or sand to remove. Clean contaminates from drain body. Drill new bolt holes if necessary, remove filings. Apply water-block sealant around the drain bowl flange in a continuous bead. Lightly rub the membrane into the sealant and set the clamping ring evenly over the flange. Secure the clamping ring by tightening the bolts finger tight then snug the bolts in alternating sequence to evenly compress the sealant.
- P. Installing Walkway/Protection Pads:
1. Apply bonding adhesive to the pad and to the roofing membrane. Install the pads over the membrane. Follow the manufacturer's recommended installation directions for self-adhering pads. Apply sufficient pressure to insure a good bond. Apply lap sealant to the full perimeter of the pad.

### **3.08 PHASING OF MEMBRANE INSTALLATION**

- A. At the end of each working day temporarily seal the loose edge of the membrane so that water does not flow beneath the covered portion. Spud off existing aggregate (if any) in the area to be sealed, remove dirt, dust, and foreign matter. Unless instructed otherwise, provide temporary seals in the presence of the Director's Representative. Install the temporary seal using one of the following methods:
1. Method 1: Apply a 12 inch wide application of hot bitumen over the area to be sealed. While hot, embed the EPDM membrane into the bitumen. Before the Work resumes cut off and discard portions of the membrane that have been embedded in the hot bitumen.

2. Method 2: Apply the membrane manufacturer's nite seal over the area to be sealed. Embed the EPDM membrane into the nite seal. Apply a continuous weight over the membrane and nite seal. Before the Work resumes cut off and discard portions of the membrane that have been embedded in the nite seal.
3. Install flashings as the membrane is being installed (same working day). If the flashing cannot be completely installed in one day, progress the installation until the flashing is in a watertight condition.

### **3.09 FIELD QUALITY CONTROL**

- A. As the joints are completed or at the end of each workday, in the presence of the Director's Representative closely examine joints in the membrane and flashing. Cut out and repair areas of the joints that are not fully bonded or that contain "fishmouths" or "wrinkles". Repair the membrane so it is restored to its full waterproof integrity. Lap patches a minimum of 6 inches beyond cuts.

**END OF SECTION**