

POLYVINYL-CHLORIDE ROOFING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section describes the requirements for furnishing and installing totally adhered polyvinyl-chloride (PVC) elastomeric singly ply roofing system at Parking Structure elevator override and stair enclosures and as required to complete the Program.
- B. Related Sections:
 - 1. Miscellaneous rough carpentry is specified in Section 06 10 53.
 - 2. Roof board insulation is specified in Section 07 22 16.
 - 3. Sheet metal flashing and trim is specified in Section 07 62 00.

1.02 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and flashings that remain watertight, do not permit the passage of water and resist uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Jobsite Safety: Execute all operations and provide a safe work environment in accordance to OSHA standards and regulations. This requirement applies to all Developer Design/Builder personnel, associated subcontractors, workers and jobsite visitors.
 - 1. Follow industry fire prevention guidelines for storage of materials, staging areas, roof access, and application means and methods.
 - 2. Applicable local fire codes supersede industry guidelines.
- D. Roofing System Design: Provide a membrane system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.
 - 1. Fire/Windstorm Classification: Class 1A-90.
 - 2. Hail Resistance: MH.

1.03 SUBMITTALS

- A. Product Data: Specifications, installation instructions and general recommendations from manufacturers of single ply membrane system for types of roofing required. Include data substantiating that materials comply with specified requirements.
- B. Shop Drawings: Show roof configuration and sheet layout at 1/8-inch = 1'-0" minimum, seam locations, details at perimeter, penetrations at mechanical equipment, plumbing and electrical penetrations, and other conditions as required, drawn at 3"=1'-0" minimum. Indicate adjacent conditions.
- C. Pre-Roofing Conference: Copies of pre-roofing conference records.
- D. Certification that materials comply with local VOC limitations.
- E. Certification that materials are compatible with sealants and waterproof flashings at perimeter conditions.
- F. Furnish manufacturer's test data on reflectance and emissivity of roofing.
- G. Warranty.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Qualified with a UL listing and FMG approval for membrane roofing system identical to that used for this Project.
- B. Installer: Approved, authorized or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.
- C. Testing Agency: An independent testing agency with the experience and capability to conduct the specified testing, as documented according to ASTM E548.
- D. Source Limitations: Obtain all components from single source roofing manufacturer.
- E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics specified as determined by testing identical products per test method below 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.
 - 1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.
 - 2. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part.
- F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements specified in Section 01 31 19. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
 - 1. Meet with County's Representative, County's insurer, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Require electrical, plumbing, HVAC and framing trades to be present at the conference.
 - 7. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 8. Review governing regulations and requirements for insurance and certificates.
 - 9. Review temporary protection requirements for roofing system during and after installation.
 - 10. Review roof observation and repair procedures after roofing installation.
- G. Preinstallation Conference: Conduct conference at the Project site. Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with County's Representative, County's insurer, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.05 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. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.06 PROJECT CONDITIONS

- A. Weather: Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements.
- B. Substrate Conditions: Do not begin roofing installation until substrates have been inspected and are determined to be in satisfactory condition.

1.07 WARRANTY

- A. Furnish manufacturer's no dollar limit written warranty, signed by manufacturer, agreeing to repair or replace defective materials and workmanship for a period of 20-years after date of Substantial Completion of work. Warranty includes roofing membrane, flashings, roofing membrane accessories, fasteners, walkway products, and other single-source components of roofing system marketed by the manufacturer.
- B. Furnish installer's warranty including all components of roofing system for a period of 2-years from date of Substantial Completion.
- C. This warranty shall be in addition to and not a limitation of other rights the County may have against the Developer Design/Builder under the Contract Documents.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURER

- A. Johns Manville "JM PVC" or approved equal.

2.02 POLYVINYL-CHLORIDE ROOFING MEMBRANE

- A. PVC Sheet: ASTM D4434, Type III, fabric reinforced that contains KEE to reduce plasticizer migration. If the membrane does not contain KEE, a post-installation coating is required to mitigate plasticizer migration.
 1. Thickness: 80-mils minimum.

2.03 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials shall be classified as no-VOC.
- B. Sheet Flashing: Manufacturer's sheet flashing of same material, type, reinforcement, thickness and color as sheet membrane.
- C. Bonding Adhesive: Manufacturer's standard water-based bonding adhesive for membrane, and solvent-based bonding adhesive for flashings.
- D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel bars, with anchors.
- E. Metal Battens: Manufacturer's standard zinc-coated steel sheet, prepunched.
- F. 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 manufacturer.
- G. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips and other accessories required for a complete, watertight installation.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with the following requirements and other conditions affecting performance of roofing system.
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Verify that cants, blocking, curbs and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thickness of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation in accordance with roofing system manufacturer's written instructions. Remove sharp projections.
- B. 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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane in accordance with ASTM D5036 and manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's personnel.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply water-based bonding adhesive to substrate at rate required by membrane manufacturer and immediately install roofing membrane. Do not apply bonding adhesive to splice area of membrane.
- E. Mechanically fasten roofing membrane at terminations, penetrations and perimeter of roofing.
- F. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

- G. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas. Remove and repair unsatisfactory sections before proceeding with work.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet manufacturer's requirements.
- H. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- I. Install roofing membrane and auxiliary materials to tie into existing roofing.
- J. Proceed with installation only after unsatisfactory conditions have been corrected.

3.04 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 solvent-based 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 sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashing into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.05 FIELD QUALITY CONTROL

- A. Testing Agency: County will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to the County's Representative. Notify the County's Representative 48-hours in advance of date and time of inspection.
- C. Repair or replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Developer Design/Builder's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.06 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 County's Representative.
- 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