

EPDM ROOF
RESTORATION SPECIFICATIONS

FOR

ALLEGHANY COUNTY PUBLIC SCHOOLS
ALLEGHANY, VA.

SHARON ELEMENTARY SCHOOL
100 SHARON SCHOOL CIRCLE
CLIFTON FORGE, VA 24422

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SECTION 07 56 00.13 – FLUID-APPLIED MEMBRANE ROOFING, INSULATED AND EPDM RESTORATION COATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Exhibits herein incorporated:
 - 1. Asbestos report
 - 2. Asbestos removal specifications
 - 3. Notes, drawings and pictures

1.2 SUMMARY

- A. This Section includes cold fluid-applied hybrid roofing systems on metal deck, consisting of the following:
 - 1. Roof Restoration Areas:
 - a. Roof Preparation and Cleaning.
 - b. Replacement of Wet Insulation and existing EPDM membrane.
 - c. Application of a fully reinforced 80 mil (base bid 20 Yr Wty) urethane based, fluid-applied membrane and flashings over existing EPDM membrane.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual" for definition of terms related to roofing work in this Section.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product specified both Specification Data Sheets and Safety Data Sheets.
- B. Sample Mock Up of Roof Restoration for Verification:
 - 1. 24" x 24" mock up to consist of:
 - a. EPDM roof membrane.
 - b. Urethane Base Coat with full reinforcement.
 - c. Urethane Top Coat.
 - d. Components of mock up shall be staggered such that each component item is visible and thickness can be visually verified. See attached photo.
 - e. After mock up is approved by the manufacturer and owner it shall be kept on the job-site to serve as a base line for what the in field installation appearance shall be.
- C. **To be included with Submittals:** A letter stating that the manufacturer has reviewed the specification and other contract documents and agrees to provide the following as specified herein:
 - 1. Specified Warranty Coverage listed in Section 1.9 B paragraph 1, as well as the follow up inspections at regular intervals during the warranty period. As a minimum inspections shall be performed in years 2, 5, 10, and 15 of the base bid warranty period. Warranty shall have a renewable clause.
 - 2. Quality Assurance Inspections as outlined herein. Refer to Section 1.7C.
 - 3. Letter shall be signed by Manufacturer's Representative, not distributor or broker.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data for Installer.
 - 1. Letter written for this Project indicating manufacturer approval of Installer to apply specified products and provide specified warranty.
- B. Qualification Data for Manufacturer.
 - 1. Verification that manufacturer meets qualification requirements as outlined in Section 1.7B.
- C. Qualification Data for Roof Inspector.
 - 1. Verification that Roof Inspector meets qualification requirements as outlined in Section 1.7C.
- D. USDA Bio Preferred Certification.
 - 1. Letter of certification confirming coating system is a USDA Bio Preferred Product.
- E. Project Schedule: Include start and end dates, project phasing, and all major or critical target dates.
- F. Air Sampling Results
 - 1. Submit air sampling test results from a similar project utilizing the identical products as specified and submitted for use on this project.
 - 2. Air samples collected, tested and reported by an accredited firm specializing in such sampling and testing.
- G. Photographs or Videotape: Show existing conditions of existing building areas, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by re-coating operations. Submit before Work begins.
- H. Contractor Daily Reports: Roofing Contractor shall prepare daily reports that record the following:
 - 1. Date
 - 2. Description of Work Performed.
 - 3. Ambient Air Temperature
 - 4. Surface Temperature
 - 5. Relative Humidity.
 - 6. Dew Point.
 - 7. Verify surface dryness by spot checking with electrical capacitance meter.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: To include in maintenance manuals.
- B. Warranties: Executed copies of approved warranty forms.
- C. Copies of Contractor Daily Reports.
- D. Copy of Manufacturer Inspection Reports.
- E. Infrared Scan results / performed by the manufacturer after job completion. Contractor shall include any post scan costs in the lump sum bid price.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of three years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Owner, and employees, and the following:

1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
 2. Have no past record of filed bankruptcy or bankruptcy protection either by same or parent company during past seven (7) years.
 3. Have a documented safety program as outlined by current OSHA regulations.
 4. Be experienced in urethane, fluid applied roofing systems.
 5. Must have been Class A licensed roofing contractor in Virginia for a minimum of five years.
 6. Must submit a Performance and Payment Bond from a bonding company having a current rating of B+ or better as rated by AM Best.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section, for roofing systems identical to that specified for this Project, with minimum five years' experience in manufacturing of specified products in successful use in similar applications.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be:
1. An authorized full-time technical employee of the manufacturer (not a sales representative).
 2. If the manufacturer does not have a local technical employee to inspect the roof installation, the manufacture may hire a roof inspector with either RRO or RRC certification as issued by the Roof Consultants Institute (RCI).
 3. Roofing inspector shall inspect the project a minimum two (2) times per week, minimum four (4) hours on roof per visit, and at all critical phases of construction. The inspector shall notify the designated Owner representative upon arrival to meet at job site. Inspection reports shall be submitted to the owner within 48 hours. Failure to submit reports could result in withholding of payments to the contractor.
- D. Preconstruction Roofing Conference: Before delivery of materials or starting any construction, conduct conference at project site. The owner shall schedule the conference within fifteen (15) days after notice of award, or project Work Order issuance. The conference shall be conducted at the project site. Review of administrative issues and methods and procedures related to the roofing system.
1. **Required Attendance:** Owner's representative(s), Contractor personnel – project manager, superintendent, and project foreman, and roof system manufacturer's representative.
 2. Meet with Owner, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 5. Review substrate requirements for conditions and finishes, including flatness and fastening.
 6. Review structural loading limitations of roof deck during and after roofing.
 7. Review base 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 if applicable. **The roofing contractor is responsible to purchase a county building permit and post at the job site until the project is complete. Include permit fees in the base bid.**
 9. Review temporary protection requirements for roofing system during and after installation.
 10. Review roof observation and repair procedures after roofing installation.
- E. Progress Meetings: Scheduled as needed by the Owner's representative. Required attendance: Owner's representative, project superintendent and foreman. Minimum agenda as follows:
1. Review status of work in progress.

2. Make field observations of completed work in place.
 3. Identify and discuss problems and/or concerns.
 4. Identify any problems, which impede planned progress.
 5. Review status of project schedule.
 6. Review and discuss corrective measures to regain projected schedules as required.
 7. Review proposed activities planned for succeeding work period.
 8. Review quality of workmanship and work standards.
 9. Review housekeeping and site conditions.
 10. Review and discuss other installation and/or administrative issues relating to work.
 11. Review any safety concerns.
- F. Final Inspection: Shall be scheduled by roofing material manufacturer upon job completion. The Contractor shall be responsible for notifying the Owner's representative of specific dates and times of inspection.
1. Required Attendance: Owner's representative, Roofing material manufacturer and Contractor personnel.
 2. Minimum agenda: Walkover inspection, identification of problems related to quality of workmanship and identification of problems, which may impede issuance of warranty.
 3. As a basis for final acceptance of the roof project, the Owner will require a roof infrared survey. The survey report must indicate the presence of no detrimental amount of moisture. If the survey report indicates deficiencies in the roof system, the contractor will rectify those deficiencies at his expense. The cost of the survey is the responsibility of the contractor.
 4. The contractor shall have fourteen (14) days from the date of the inspection to correct any discrepancies that were discovered during the final inspection.
- G. Random sampling:
1. Roofing material:
 - a. During course of work the Owner's representative may secure samples according to ASTM D140-70 (or other applicable standard) of materials being used from containers at job site and submit them to an independent laboratory for comparison to specified material.
 - b. Should test results prove that a material is not functionally equal to specified material:
 - 1) Contractor shall pay for all testing.
 - 2) Roofing installed and found not to comply with the specifications shall be removed and replaced at no change in the contract price.
- H. **Daily Communications: Due to the sensitive nature of the school buildings, daily communications between contractor, owner and roof system manufacturer's representative shall be a requirement of this contract. The contractor shall initiate this communication.**
- I. Moisture control: Contractor is responsible for moisture control in areas or sections of roof where activity has begun.
- J. Plans and Specifications: The contractor shall have a complete set of the contract documents to include drawings, specifications, shop drawings, submittals, change orders and addenda on site at all times. Documents shall be made readily available to Owner's Representative(s).
- 1.8 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, approval or listing agency markings, 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.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- 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.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Protect building, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from roofing operations.
- B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- C. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Store all materials prior to application at temperatures between 60 and 90 deg. F.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer. Do not apply materials when air temperature is expected to drop below 40 degrees the night after coating or when daytime temperatures exceed 110 deg. F. Do not apply roofing in snow, rain, fog, or mist.
- D. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
- E. **Owner will occupy portions of building immediately below roofing area. Conduct roofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.**
- F. 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.
- G. Environmental Requirements: Coordinate with and advise Owner's representative when volatile materials are to be used near air ventilation intakes. Allow sufficient time before application to allow preventative measures to be put into place.
- H. Existing Building Conditions.
 - 1. Building space directly under roof area covered by this specification will be utilized by on-going operations. Do not interrupt Owner's operations unless prior written approval is received.
 - 2. Access to roof shall be from exterior only. No employees of the roofing company will be allowed within the building without Owner approval.
 - 3. Air-conditioning units and other equipment, if necessary, shall be moved as required to install roofing materials complete and in accordance with plans and specifications. Carefully disconnected and remove existing equipment as indicated. Store existing equipment as not to damage any part or component thereof. Reconnect existing equipment and return to operating condition. If during the course of construction, it should become necessary to disconnect existing HVAC equipment, there shall be no more than 24 hours down time. Should the required work exceed this period the contractor shall provide at no additional cost to the owner, alternate methods of heating or cooling the affected areas.
 - 3. All disconnection and re-connection work shall be performed by a mechanical and/or electrical sub-contractor licensed to perform such work. The Roofing Contractor is responsible for coordination and completion of all work.

4. Appropriate measures shall be taken to prevent dust, vapors, gases or odors from entering the building during roof removal, replacement or repair.
5. Roofing contractor shall be responsible for any damage to job site during roofing project, including interior and exterior of the building until punch list is complete.

I. Safety Requirements:

1. All application, material handling, and associated equipment shall conform to and operated in conformance with OSHA safety requirements.
2. Comply with federal, state, and local fire and safety requirements.
3. Advise Owner whenever work is expected to be hazardous to Owner's employees and/or operators.
4. Maintain a crewman as a floor area guard whenever roof decking is being repaired or replaced.
5. Maintain fire extinguisher within easy access on roof whenever power tools are being used.
6. No kettle, open flame torch or any other open flame tool is to be used on site.
7. No smoking on any school property, including the roof, at any time.

J. Temporary Sanitary Facilities:

1. Furnish, install, and maintain temporary sanitary facilities for employee use during project. Remove at project completion.
2. Place portable toilets in compliance with applicable laws, codes, and regulations.

1.10 WARRANTY

A. Warranty, General: Warranties specified shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Base Bid Warranty Period: 20 years from date of Substantial Completion.

1. Warranty shall explicitly require the manufacturer to perform follow up inspections and housekeeping at regular intervals during the warranty period. As a minimum, inspections shall be performed in years 2, 5, 10, and 15.
 - a. The owner shall be provided a report with the results of the inspection and details of any preventive maintenance or other items that require owner's attention.
2. Warranty shall include an explicit written provision allowing for extension / renewal of Warranty at the end of the 20 Year Period.
3. Roof System Warranty Coverage, General: Warranty shall cover labor and material for leak repairs on the entire weatherproofing assembly and restored roof system to include components supplied and / or manufactured by others. Coverage shall include, but not necessarily limited to:
 4. Existing and New Roof Membrane.
 5. Existing and New Insulation.
 6. Existing and New Flashing.
 7. All termination details and components.
 8. All sheet metal related details to include contractor fabricated sheet metal components.
 9. Roofing membrane accessories.
 10. Fasteners, cover board and other components of the roofing system.
 11. New roof walkway surfaces.

Note: The roofing manufacturer's warranty period shall begin from the first day of roof completion and final inspection acceptance.

C. Installer's Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section and related Sections indicated above, including all components of new roofing such as restored EPDM membrane, new modified roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers and non-slip walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer/Product: Subject to compliance with all specified requirements including material performance requirements, quality control inspections, and warranty coverage provide primary materials from one of the three following manufacturers:
1. Tremco - Basis of Design: Alphaguard Bio, Fluid Applied, Restoration System
 2. Kemper
 3. 3M

2.2 PERFORMANCE REQUIREMENTS OF FLUID APPLIED COATING SYSTEM:

- A. Cured dry mil thickness of Restoration Coating shall not be less than 80 mils.
- B. Coating System shall be urethane based. Acrylics and Silicones will not be accepted.
- C. Coating System shall be 100% solids by volume in accordance with ASTM D 2697.
- D. Coating shall be a catalyzed system as opposed to a moisture curing or moisture triggered curing system.
- E. Base Coat shall be fully reinforced with polyester based fleece over entire roof as required by the specifications.
- F. Coating shall be UL Classified for Fire Rating.
- G. Coating shall have a SRI not less than 100.
- H. Coating shall be BIO based and certified as part of USDA's Bio Preferred Program.
- I. Coating system shall be very low odor as determined by designated owner's representatives and, if necessary and requested by the Owner, shall be proven safe by air sampling during an actual project of similar scope.

2.3 MATERIALS

- A. General: Roofing materials recommended by roofing system manufacturer for intended use and compatible with components of existing membrane roofing system.

2.4 FLUID-APPLIED ROOFING MEMBRANE FOR USE OVER NEW EPDM (WET REPLACEMENT AREAS) OR EXISTING EPDM MEMBRANE (RESTORATION AREAS)

Polyurethane Elastomeric Fluid-Applied System: Two-coat, fully reinforced, fluid-applied roofing membrane formulated for application over prepared roofing substrate.

1. Basis of design product: Tremco Alphaguard Bio
- B. Bio-Based Polyurethane Roof Coating Base Coat: ASTM D7311, Two-part catalyzed low-odor polyurethane roof base coating formulated for direct application and for use with fiber reinforcement in conjunction with a compatible top coat.
1. Basis of design product: Tremco Alphaguard Bio Base Coat
 2. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 1 g/L.
 3. Combustion Characteristics, UL 790: Class A.
 4. Bio-Based Content: Not less than 20 percent.
 5. Percent solids, by volume, ASTM D 2697: 100.
 6. Percent solids, by weight, ASTM D 1644: 100.

- C. Bio-Based Polyurethane Roof Coating Top Coat: ASTM D7311, Two-part catalyzed low-odor polyurethane roof top coating formulated for direct application over compatible reinforced base coat.
 - 1. Basis of design product: Tremco Alphaguard Bio Top Coat
 - 2. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 6 g/L.
 - 3. Combustion Characteristics, UL 790: Class A.
 - 4. Bio-Based Content: Not less than 20 percent.
 - 5. Percent solids, by volume, ASTM D 2697: 100.
 - 6. Percent solids, by weight, ASTM D 1644: 100.
 - 7. Water Vapor Transmission, ASTM E 96, Wet Cup: 0.020 perm-in (1.32 g/m²/day).
- D. Polyester Reinforcing Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - 1. Basis of design product: Tremco Permafab
 - 2. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
 - 3. Elongation, ASTM D 1682: Not less than 60 percent.
 - 4. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
 - 5. Weight: 3 oz. /sq. yd. (102 g/sq. m)..

2.5 AUXILIARY ROOFING MEMBRANE MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with existing roofing system and fluid-applied roofing system.
- B. Structural Concrete/Masonry Primer: Two-component, 100 percent solids, epoxy penetrating primer for concrete deck surfaces.
- C. Metal Surface Primer: Single-component, water based primer to promote adhesion of base coat to metal surfaces.
- D. Asphaltic Surfaces Primer: Single-component, multi-substrate primer to promote adhesion of base coat to surfaces recommended by manufacturer.
- E. Joint Sealant: Single component, high solids, moisture curing polyurethane sealant recommended by coating manufacturer.
- F. EPDM Membrane: For Restoration Areas where wet insulation is to be removed. EPDM compatible with existing membrane of same type and thickness. Install mechanically attached, reinforced EPDM membrane compatible with existing and adhere tie-ins with manufacturer's recommended bonding or seam tape adhesive. Seal perimeter of repair with manufacturer's recommended material.
- G. Aggregate: For finish coat slip resistance: Silica sand, 20 – 40 mesh or No.11 ceramic granules.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing manufacturer for application.
- I. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.
- J. Wood Blocking: Mixed Southern Pine. No. 2 grade lumber with maximum moisture content of 19%.
- K. Sheet Metal: Match existing in kind, thickness and color.
- L. Rust Inhibitor for Rusted Deck: Rust inhibiting primer as manufactured by Rust-O-Leum.

- M. EPDM Accessories: cleaners, primers, peel and stick materials, cured and uncured flashing as recommended by EPDM manufacturer: Carlisle, Firestone, or approved equal.
- N. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer and generally recognized by industry standards for purpose intended.

2.6 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. In-Fill Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, approved and listed by FM Global for windstorm and fire characteristics specified, CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces. CCMC listed.
 - 1. Compressive Strength, ASTM C1621: Grade 2: 20 psi.
 - 2. Thickness: Refer to Roof Plans. For Restoration Areas: Match Existing.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated. Cricket slope shall be double the field slope.

2.7 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with the specified roofing system.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4450 or 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- C. Insulation Adhesive: Two-component, solvent-free, low odor, elastomeric urethane adhesive formulated to adhere roof insulation to substrate.
 - 1. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
 - 2. Flame Spread Index, ASTM E 84: 10.
 - 3. Smoke Developed Index, ASTM E 84: 30.
 - 4. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 0 g/L.
 - 5. Tensile Strength, minimum, ASTM D 412: 250 psi (1724 kPa).
 - 6. Peel Adhesion, minimum, ASTM D 903: 17 lbf/in (2.98 kN/m).
 - 7. Flexibility, 70 deg. F (39 deg. C), ASTM D 816: Pass.
- D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- E. Tapered Edge Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

2.8 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 curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Verify that blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. For Restoration: Verify that existing surfaces are dry and prepared in accordance with manufacturer's recommendations. Also verify atmospheric conditions are suitable for application of coating materials.

- B. Proceed with installation once unsatisfactory conditions have been corrected.

2.9 PREPARATION

- A. For Replacement areas: Removal and proper disposal of existing EPDM roof membrane, wet insulation boards and accessories.
- B. For Restoration areas:
 - 1. Membrane Surface Preparation:
 - a. Remove loose debris from surface, with brooms and leaf blowers.
 - b. Remove substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.
 - c. Repair membrane at locations where irregularities have been removed. Remove areas of wet insulation and replace with the specified insulation and membrane products.
 - d. Substrate Cleaning: In accordance with manufacturer requirements clean all Epdm and concrete roof substrates of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at maximum 2,000 psi. Allow to dry thoroughly.
 - e. Verify adhesion of new products.
 - f. Prime surfaces in accordance with manufacturer's recommendations.
 - 2. Existing Flashing and Penetration Detail Preparation:
 - a. Repair flashings, gravel stops, copings, and other roof-related sheet metal and trim elements. Reseal joints, replace loose or missing fasteners, and replace components where required to leave in a watertight condition.
 - b. Do not damage metal coping, counterflashings or other components that are to remain. Replace any damaged components with in kind, matching color material. Where necessary, replacement metal areas will be identified with spray paint and on the roof plan.
 - c. Wire brush clean and prime drain bowls and sheet metal surfaces required by manufacturer.
 - d. Replace any damaged metal counterflashing or perimeter parapet wall metal coping where marked on roof and shown on roof plan. Follow detailed drawings for replacement details.
- C. Protect existing roofing system that is indicated to remain, and adjacent portions of building and building equipment.
 - 1. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - 2. Maintain temporary protection and leave in place until replacement roofing has been completed.
- D. If necessary and requested by the Owner, shut down air intake equipment in the vicinity of the Work in coordination with the Owner. Cover air intake louvers before proceeding with re-coating work that could affect indoor air quality or activate smoke detectors in the ductwork.
 - 1. Verify that rooftop utilities and service piping affected by the Work have been shut off before commencing Work.
 - 2. **Coordinate above steps closely and in coordination with the Owner.**
- E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 - 1. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

2.10 ROOFING INSTALLATION, GENERAL

- A. Install roofing membrane according to roofing manufacturer's written instructions.
 - 1. Commence installation of roofing in presence of manufacturer's technical personnel.
- B. Coordinate installation of roofing so insulation and other components of roofing not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing sheets and insulation with a course of coated felt set in roofing cement with joints and edges sealed.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Substrate-Joint Penetrations: Prevent fluid-applied materials and adhesives from penetrating substrate joints, entering building, or damaging built-up roofing components or adjacent building construction.

2.11 INSULATION INSTALLATION

- A. Comply with roofing manufacturer's written instructions for installing roof insulation.
- B. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- C. Install insulation under area of wet roof replacement to achieve required matching thickness of existing roof. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- E. Install tapered edge strips at drains and any other required areas (see detailed drawings).
- F. Fastened Insulation:
 - 1. Fasten insulation to metal deck in accordance with manufacturer's requirements and in accordance with wind uplift requirements.

2.12 FLUID-APPLIED FLASHING APPLICATION

- A. Fluid-Applied Flashing and Detail Base Coat Application: Complete base coat and fabric reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane. Apply base coat in accordance with manufacturer's written instructions.
 - 1. Prepare and prime surfaces as recommended by manufacturer.
 - 2. Extend coating minimum of 8 inches up vertical surfaces and 4 inches onto horizontal surfaces.
 - 3. Back roll to achieve a minimum wet mil coating thickness 48 mils unless otherwise recommended by manufacturer. Verify thickness of base coat as work progresses.
 - 4. Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches along edges and 6 inches at end laps.

5. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
6. Roof Drains: Install base coat onto surrounding membrane surface and metal drain bowl flange. Install target piece of fabric reinforcement immediately into wet base coat and roll to fully embed and saturate fabric. Reinstall clamping ring and strainer following application of top coat. Replace broken drain ring clamping bolts.
7. Allow base coat to cure prior to application of top coat.
8. Apply top coat as recommended by manufacturer. NOTE: if base coat sits longer than 72 hours prior to top coat application then prime base coat.

2.13 FLUID-APPLIED MEMBRANE APPLICATION

- A. Base Coat: Apply base coat to field of membrane in accordance with manufacturer's written instructions.
 1. Apply base coat on prepared and primed surfaces and spread coating evenly.
 2. Back roll to achieve minimum wet mil coating thickness of 48 mils unless otherwise recommended by manufacturer; verify thickness of base coat as work progresses.
 3. Embed fabric reinforcement into wet base coat over entire roof surface tie-in to all flashed vertical wall and curb flashing surfaces. Lap adjacent pieces of fabric minimum 3 inches along edges and 6 inches at end laps. One layer of reinforcement is required to roof and all flashings.
 4. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings. Lightly apply additional base coat where necessary to completely seal reinforcing fabric.
 5. Allow base coat to cure prior to application of top coat.
- B. Top Coat: Apply top coat to all membrane and flashings uniformly in a complete, continuous installation.
 1. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.
 2. Apply top coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top coat over field base coat and spread coating evenly.
 3. Back roll to achieve wet mil thickness of 32 mils. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.
- C. Slip-Resistant Walkway Topcoat: Apply walkway second topcoat following application and curing of top coat. Locate as indicated on Drawings.
 1. Mask out walkway locations with painters tape.
 2. Prime first top coat prior to application of walkway top coat if walkway top coat is not applied within 72 hours of the first top coat application, using manufacturer's recommended primer.
 3. Back roll to achieve minimum coating thickness of 20 wet mils (0.5 wet mm) unless greater thickness is recommended by manufacturer.
 4. Broadcast 30 lb per 100 sq. ft. (9.6 to 14.6 kg per 10 sq. m) of Slip-Resistant Top Coat Aggregate in wet top coat.
 5. Back roll aggregate and top coat creating even dispersal of aggregate. Remove masking immediately.
 6. Sweep away and dispose of all loose aggregate after walkways are completely dry.

2.14 FIELD QUALITY CONTROL

- A. Roof Inspection: Contractor shall engage roofing system manufacturer's technical personnel to inspect roofing installation, and submit report to the Owner. Notify Owner 48 hours in advance of dates and times of inspections. Inspect work as follows:
 - 1. Installation of Insulation and base sheet.
 - 2. Installation urethane flashings. A "pre-final" inspection of all flashing details shall be completed prior to installation of base coat.
 - 3. Installation of fully reinforced base coat.
 - 4. Installation of urethane top coat.
 - 5. Metal Details.
 - 6. A minimum of two (2) inspections per week is required for the duration of the project.
 - 7. Inspection reports shall record environmental conditions similar to contractor daily reports and indicate any issues that require attention. Each report shall contain progress photos.
- B. Repair fluid-applied membrane where inspections indicate non-compliance with specified requirements.
- C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

2.15 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period.
- B. Correct deficiencies in or remove coating that does not comply with requirements, repair substrates, and reapply coating.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

SECTION CONTINUES

ATTACHED:

- 1. Roof Installers Warranty

2.16 ROOFING INSTALLER'S WARRANTY

A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: _____
2. Address: _____
3. Building Name/Type: _____
4. Address: _____
5. Area of Work: _____
6. Acceptance Date: _____
7. Warranty Period: _____
8. Expiration Date: _____

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding **[74 mph (33 m/s)]**;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment

of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed by:

1. Authorized Signature: _____
2. Name: _____
3. Date: _____

END OF SECTION 07 56 00.13