

SECTION 07 01 50
Elastomeric Roof Repair and Restoration

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Roof rehabilitation and coating preparation.
 - 2. Application of fluid-applied roof membrane and flashings over existing modified bituminous membrane roofing.

1.2 Related Requirements:

- A. Division 01 Section "Summary" for use of the premises and phasing requirements, and for restrictions on use of the premises due to Owner or tenant occupancy.

1.3 MATERIALS OWNERSHIP

- A. The Contractor shall own demolished and waste materials and will remove them from the site.

1.4 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.
- B. Roofing Coating Preparation: Existing roofing that is to remain and be prepared to accept restorative coating application.
- C. Patching: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system and replacement with compatible similar materials.
- D. Remove: Detach items from existing construction and legally dispose of them off-site.
- E. Existing to Remain: Unaltered existing items of construction.
- F. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- G. Demolition Waste: Building and site improvement materials resulting from re-roofing preparation, demolition, or selective demolition operations.
- H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- I. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.

1.6 INFORMATIONAL SUBMITTALS

- A. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
- B. Product Test Reports: If requested, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing rehabilitation system.
- C. Warranties: Unexecuted sample copies of special warranties.

- D. Inspection Reports: Daily reports of Roofing Inspector. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions required and carried out.
- 1.7 CLOSEOUT SUBMITTALS
- A. Maintenance Data: To include in maintenance manuals.
 - B. Warranties: Executed copies of approved warranty forms.
- 1.8 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, and employees, and the following:
 - 1. Qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
 - B. Manufacturer Qualifications: Primary product manufacturer that is UL listed for roofing system identical to that specified for this Project with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.
 - 1. Approval of Other Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of five installations of specified products with Owner and Architect contact information.
 - e. Sample warranty.
 - 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 one of the following:
 - 1. An authorized full-time technical employee of the manufacturer.
- 1.9 PROJECT CONDITIONS
- A. Weather Limitations: Proceed with rehabilitation 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 recommended by manufacturer.
 - 2. Apply coatings within range of ambient and substrate temperatures recommended by manufacturer.
 - 3. Do not apply roofing in snow, rain, fog, or mist.
 - B. Protect building to be rehabilitated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from rehabilitation operations.
 - C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

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- 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 re-coating area. Conduct re-coating 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.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard or customized form in which manufacturer agrees to repair or replace components of fluid-applied membrane roofing that fail in materials or workmanship within specified warranty period.
 - 1. Warranty includes roofing membrane, base flashings, roof membrane accessories, roof insulation, fasteners and cover boards and other components of fluid-applied roofing.
 - 2. Warranty Period:
 - a. 20 years.
- B. Manufacturer Inspection: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.
 - 1. Inspections to occur in following years: 2, 5, 10, 15 and 20 following completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com, that are named in other Part 2 articles. Provide specified products.
 - 1. Subject to compliance with requirements, provide products by manufacturer meeting qualification requirements in Quality Assurance Article.
 - a. Sika "Sikalastic RoofPro".
 - b. Kemper "2K-PUR".
 - c. Pre-Approved Equal.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Rehabilitated roofing shall withstand exposure to weather without failure or leaks due to defective manufacture or installation.
 - 1. Accelerated Weathering: Roofing system shall withstand 5000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
- C. Exterior Fire-Test Exposure: Roofing system exterior fire-test exposure performance following application of rehabilitation coating shall be not be less than that of the pre-rehabilitated roof performance when tested in accordance with ASTM E 108, based upon manufacturer's tests of identical applications.
- D. Energy Performance: Provide rehabilitated roofing listed on the EPA/DOE's "ENERGY STAR Roof Product List."

2.3 MATERIALS

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

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- B. Infill Materials: Where required to replace test cores and to patch existing roofing, use infill materials matching existing membrane roofing system materials, unless otherwise indicated.
 - C. Temporary Roof Drainage: Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.
- 2.4 FLUID-APPLIED ROOFING MEMBRANE
- A. Polyurethane Elastomeric Fluid-Applied System: Two-coat fluid-applied roofing membrane formulated for application over prepared existing roofing substrate.
 - 1. Polyurethane roof coating system base coat, bio-based, low-odor low-VOC two-part, for use with a compatible top-coat.
 - a. Basis of design product: Tremco, AlphaGuard BIO Base Coat.
 - b. Combustion Characteristics, UL 790: Class A, for two-coat system.
 - c. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 1 g/L.
 - d. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.
 - e. Hardness, Shore A, minimum, ASTM D 2240: 88.
 - f. Solids, by volume, ASTM D 2697: 100 percent.
 - g. Bio-Based Content: Not less than 70 percent.
 - h. Minimum Thickness, Base Coat reinforced over Granular Surfaced MB: 64 wet mils.
 - 2. Polyurethane roof coating system top-coat, bio-based low-odor low-VOC two-part, for application over compatible base coat.
 - a. Basis of design product: Tremco, AlphaGuard BIO Top-coat.
 - b. Combustion Characteristics, UL 790: Class A, for two-coat system.
 - c. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 6 g/L.
 - d. Solar Reflectance Index (SRI), ASTM E 1980: For white, not less than 103.
 - e. Accelerated Weathering, 5000 hours, ASTM G 154: Pass.
 - f. Hardness, Shore A, minimum, ASTM D 2240: 82.
 - g. Solids, by volume, ASTM D 2697: 85 percent.
 - h. Bio-Based Content: Not less than 60 percent.
 - i. Minimum Thickness, reinforced system: 32 wet mils.
 - j. Minimum Thickness, Slip-Resistant Coat: 24 wet mils.
 - k. Color: White.
 - 3. Primer for Non-Porous Surfaces: Single-part, water based primer to promote adhesion of urethanes to metals and other non-porous surfaces..
 - a. Basis of design product: Tremco, AlphaGuard M-Prime.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 22 g/L.
 - c. Nonvolatile Content, minimum, ASTM D1644: 5 percent.
 - B. Fluid-Applied Membrane Reinforcing Fabric:
 - 1. Polyester Reinforcing Fabric: 100 percent stitch-bonded mildew-resistant polyester fabric intended for reinforcement of compatible fluid-applied membranes and flashings.
 - a. Basis of design product: Tremco, Permafab.
 - b. Tensile Strength, ASTM D 1682: Not less than 50 lbf. (222 N).
 - c. Elongation, ASTM D 1682: Not less than 60 percent.
 - d. Tear Strength, ASTM D 1117: Not less than 16 lbf. (70 N).
 - e. Weight: 3 oz./sq. yd (102 g/sq. m).
- 2.5 AUXILIARY 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. Seam Sealer Mastic: Waterproof seam and patching material compatible with applied coating.
 - 1. Elastomeric Seam Sealer: White, single-component high solids moisture curing aliphatic polyurethane sealant formulated for compatibility and use with specified roofing substrates.
 - a. Basis of design product: Tremco, GEOGARD Seam Sealer.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 189 g/L.
 - c. Tensile Strength, ASTM D 412: 270 psi.
 - d. Tear Strength, ASTM D 412: 35 pli.
 - e. Elongation, ASTM D 412: 220 percent.
- C. Joint Sealant: Elastomeric joint sealant compatible with applied coating, with movement capability appropriate for application.
 - 1. Joint Sealant, Polyurethane: ASTM C 920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.
 - a. Basis of design product: Tremco, TremSEAL Pro.
 - b. Volatile Organic Compounds (VOC), maximum, ASTM D 3960: 40 g/L.
 - c. Hardness, Shore A, ASTM C 661: 40.
 - d. Adhesion to Concrete, ASTM C 794: 35 psi.
 - e. Tensile Strength, ASTM D 412: 350 psi.
 - f. Color: Closest match to substrate.
- D. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

PART 3 EXECUTION

3.1 PROTECTION

- A. Protect existing roofing system that is indicated not to be rehabilitated, and adjacent portions of building and building equipment.
- B. Mask surfaces to be protected. Seal joints subject to infiltration by coating materials.
- C. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
- D. Maintain temporary protection and leave in place until replacement roofing has been completed.
- E. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.
 - 1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade.
- F. 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.
- G. 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.

3.2 ROOFING COATING PREPARATION

A. Removal of Wet Insulation: Remove designated portions of roofing membrane with underlying wet insulation. Remove wet insulation, fill in tear-off areas to match existing insulation and membrane, and prepare patched membrane for roof coating application specified below.

B. Membrane Surface Preparation:

1. Remove loose granular aggregate from granular aggregate-surfaced built-up bituminous roofing with a power broom.
2. Remove blisters, ridges, buckles, roofing membrane fastener buttons projecting above the membrane, and other substrate irregularities from existing roofing membrane that would inhibit application of uniform, waterproof coating.
3. Broom clean existing substrate.
4. Substrate Cleaning: Clean substrate of contaminants such as dirt, debris, oil, and grease that can affect adhesion of coating by power washing at maximum 2,000 psi.
 - a. Dispose of wastewater in accordance with requirements of authorities having jurisdiction.
5. Verify that existing substrate is dry before proceeding with application of coating. Spot check substrates with an electrical capacitance moisture-detection meter.
6. Verify adhesion of new products.

C. Surface Priming: Prime surfaces to receive fluid-applied coating using coating manufacturer's recommended product for surface material. Apply at application rate recommended by manufacturer.

1. Ensure primer does not puddle and substrate has complete coverage.
2. Allow to cure completely prior to application of coating.

3.3 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. Apply base coat on prepared and primed surfaces and spread coating evenly. Extend coating minimum of 8 inches (200 mm) up vertical surfaces and 4 inches (100 mm) onto horizontal surfaces.
2. Back roll to achieve not less than minimum coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer. Verify thickness as work progresses.
3. Fabric Reinforcement: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.
 - a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
4. 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.

5. Allow base coat to cure prior to application of top-coat.
- 3.4 FLUID-APPLIED MEMBRANE APPLICATION
- A. Fluid-Applied Membrane 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 not less than minimum coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer. Verify thickness as work progresses.
 3. Fabric Reinforcement: Embed fabric reinforcement into wet base coat. Lap adjacent flashing pieces of fabric minimum 3 inches (75 mm) along edges and 6 inches (150 mm) at end laps.
 - a. Roll surface of fabric reinforcing to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
 - b. Following curing of base coat and prior to application of top-coat, sand raised or exposed edges of fabric reinforcement.
 - B. Top-coat Application: Apply top-coat to field of membrane and flashings uniformly in a complete, continuous installation.
 1. Allow base coat to cure prior to application of top-coat.
 2. Following curing of base coat and prior to application of top-coat, sand raised or exposed edges of fabric reinforcement.
 3. 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.
 4. Apply top-coat extending coating up vertical surfaces and out onto horizontal surfaces. Install top-coat over field base coat and spread coating evenly.
 5. Back roll to achieve not less than minimum coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer. Verify thickness as work progresses.
 6. 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 walkway location with 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. Apply walkway top coat and back roll to achieve not less than minimum coating thickness indicated in Part 2 product listing, unless greater thickness is recommended by manufacturer. Verify thickness as work progresses.
 4. Broadcast Slip-Resistant Top-coat Aggregate in wet top-coat at rate indicated in Part 2 product listing or as otherwise recommended by coating manufacturer.
 - a. Back roll aggregate filled top-coat creating even dispersal of sand. Remove masking immediately.
- 3.5 FIELD QUALITY CONTROL
- A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

- B. Roof Inspection: Engage roofing system manufacturer's technical personnel to inspect roofing installation and submit report. Notify Architect or Owner 48 hours in advance of dates and times of inspections. Inspect work as follows:
 - 1. Upon completion of preparation of roof coating substrate, prior to application of coating materials.
 - 2. Following application of coating to flashings and application of base coat to field of roof.
 - 3. Upon completion of coating but prior to re-installation of other roofing components.
 - C. Repair fluid-applied membrane where test inspections indicate that they do not comply with specified requirements.
 - D. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.
- 3.6 DISPOSAL
- A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 - 1. Storage or sale of demolished items or materials on-site is not permitted.
 - B. Transport and legally dispose of demolished materials off Owner's property.
- 3.7 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.

END OF SECTION