SECTION 07 14 16.20

INTERIOR WATERPROOFING SYSTEM FOR TILE SURFACING (KEMPEROL )

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\*\* NOTE TO SPECIFIER \*\* Kemper System, Inc.; Waterproofing Membrane products.  
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This section is based on the products of Kemper System, Inc., which is located at:  
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Kemper System is the worldwide leader, innovator and manufacturer of the highest quality, cold liquid-applied, fully reinforced waterproofing and roofing membranes in the industry. Architects, engineers, roofing consultants, quality contractors and building owners have come to trust Kemper System when only the best will do.  
  
For over 50 years, Kemper System waterproofing, roofing and surfacing products have been protecting some of the world's most important landmarks and valuable properties. With offices in 10 countries, Kemper System membranes protect over 2 billion square feet of surfaces under the most adverse conditions.  
  
From the top of the Empire State Building to Buckingham Palace to the Alaskan Pipeline, when there is a critical waterproofing, roofing and surfacing challenge, Kemper System delivers the solution.  
This Specification includes Kemperol Interior Waterproofing System. KEMPEROL®022 is a two-component, cold liquid resin waterproofing membrane system. KEMPEROL®022 is a low odor and solvent free, Low VOC, cold liquid-applied, fleece reinforced, polymeric resin waterproofing membrane system. System is intended as a waterproofing system used in conjunction with floor and wall tile surfaces.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Cold fluid-applied liquid resin waterproofing membrane and flashing system.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete
    2. Section 06 61 16 - Solid Surfacing Fabrications.
    3. Section 07 26 00 - Vapor Retarders.
    4. Section 09 32 00 - Mortar-Bed Tiling.
    5. Section 22 11 13 - Facility Water Distribution Piping
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ACI-308 - Recommended Practice for Curing Concrete
    2. ASTM D 4258 - Standard Practice for Surface Cleaning Concrete for Coatings
    3. ASTM D 4259 - Standard Practice for Abrading Concrete
    4. ASTM D 4541 - Method for Pull-Off Strength of Coatings using Portable Adhesion Tester
    5. ASTM E 96 - Tests for Water Vapor Transmission of Materials in Sheet Form
    6. International Concrete Repair Institute - Guideline 03732 Concrete Surface Preparation
    7. ANSI - A118.10 Tile Adhesion Shear Test
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Product Literature.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Installation methods.
        5. Safety Data Sheets (SDS) for all components.
     3. Shop Drawings: Show including plans and details of cold, fluid applied, reinforced waterproofing system including plan, flashing details, and attachment.
     4. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, thickness, color, texture and surfacing.
     5. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
     6. Closeout Submittals: Submit waterproofing manufacturer and applicator's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing cold fluid-applied reinforced resin waterproofing system with a minimum of 20 years of documented experience with applications in the United States.
     2. Installer Qualifications: Company specializing in performing the work of this section with a minimum of 3 years documented experience.
     3. Source Limitations: Obtain all principal components of waterproofing system from a single manufacturer. Secondary products that are required shall be as recommended and approved in writing by the waterproofing system manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the manufacturer.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
       1. Prepare and clean a 3 foot (0.9 m) by 3 foot (0.9 m) area of each substrate material type anticipated and located in areas designated by Architect.
       2. Test each area to verify that substrate preparation meets specified requirements. Tests shall include tensile bond strength and moisture content of substrate.
       3. Do not proceed with the work until test results and workmanship are approved by Architect.
       4. Rework mock-up area as required to produce acceptable work.
       5. Maintain mock-up for quality control during the progress of the remaining work.
  1. PRE-INSTALLATION CONFERENCE
     1. Convene a pre-installation conference approximately two weeks before scheduled commencement of waterproofing system installation and associated work.
     2. Require attendance of installers of substrate construction to receive waterproofing, installers of work in and around waterproofing which must precede or follow waterproofing work including plumbing penetrations, equipment openings, subsequent tile finish work, and the Architect, and Owner's representative.
     3. Objectives include:
        1. Review foreseeable methods and procedures related to waterproofing work, including set up and mobilization areas for stored material and work area.
        2. Tour representative areas of waterproofing substrates, inspect and discuss condition of substrate, penetrations and other preparatory work.
        3. Review plumbing penetrations.
        4. Review waterproofing system requirements, Drawings, Specifications and other Contract Documents.
        5. Review and finalize schedule related to waterproofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
        6. Review required inspection, testing, certifying procedures.
        7. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Store products in manufacturer's unopened packaging with labels intact until ready for installation.
     2. Store materials off the ground or on pallets, under cover and in a cool, dry location, out of direct sunlight, in accordance with manufacturer' s recommendations. Store roll goods horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. Do not use rolls that are wet, dirty or have damaged ends. Materials must be kept dry at all times. Plastic wrapping installed at the factory should not be used as outside storage covers.
     3. Do not store materials in quantities that exceed design loads, damage substrate materials, hinder installation or drainage.
     4. Follow manufacturer's directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified. Fleece reinforcing materials must be clean, dry and free of all contaminants.
     5. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of the MSDS and local authorities having jurisdiction.
     6. Maintain copies of all current MSDS for all components on site. Provide personnel with appropriate safety data information and training as it relates to the specific chemical compounds to be utilized.
  3. SEQUENCING
     1. Apply waterproofing in a timely manner in conjunction with work of other trades. Coordinate with other trades to avoid traffic over or against completed membrane surfaces.
     2. Coordinate with installation of plumbing and drains as shown on Drawings, including flashing, and associated waterproofing work.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
     2. Application of cold fluid-applied reinforced resin waterproofing membrane may proceed while air temperature is between 50 degrees F (10 degrees C) and 95 degrees F (35 degrees C) providing the substrate is a minimum of 5 degrees F above the dew point.
     3. Ensure that substrate materials are dry and free of contaminants. Do not commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.
     4. Where required by the Architect, implement odor control and elimination measures prior to and during the application of the waterproofing materials. Control/elimination measures shall be field tested at off-hours and typically consists of 1 or a multiple of the following measures
        1. Sealing of air intakes with activated carbon filters. Install filters in accordance with requirements and recommendations of the filter manufacturer. Seal filters at joints and against building exterior walls to prevent leakage of unfiltered air.
        2. Sealing of doorways, windows, and skylights with duct tape and polyethylene sheeting to prevent leakage of air into other parts of the building.

\*\* NOTE TO SPECIFIER \*\* Select the warranty required from the following paragraphs and delete those not required.

* 1. WARRANTY
     1. Manufacturer's Material Warranty: Provide 10 year manufacturer's material only warranty for supply of membrane only, limited to amounts necessary to effect repairs necessitated solely by material defective in content and composition.

\*\* NOTE TO SPECIFIER \*\* Installer warranties are recommended and are becoming more common. Such warranties generally ensure a more vested interest in the integrity of the installation. Insert 2 or 5 year installer warranty period as required.

* + 1. Waterproofing applicator's Warranty: Provide \_\_ year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

1. PRODUCTS
   1. MANUFACTURERS

\*\* NOTE TO SPECIFIER \*\* Select one of the following two paragraphs as applicable.

* + 1. Acceptable Manufacturer: Kemper System America, Inc., which is located at: 1200 North America Drive; West Seneca, NY 14224; Toll Free Tel: 800-541-5455; Fax: 716-558-2978; Email: [request info (inquiry@kempersystem.com)](https://admin.arcat.com/users.pl?action=UserEmail&company=Kemper+System+America,+Inc.&coid=44753&rep=&fax=716-558-2978&message=RE:%20Spec%20Question%20(07147kem):%20%20&mf=); Web: <http://www.kemper-system.com/us/eng>
    2. Acceptable Manufacturer: Kemper System Canada, Inc., which is located at: 6345 Netherhart Road, Unit 4 Mississauga, Ontario L5T 1B8 Tel: 905-624-5463. Fax: 905-624-2840. Email: inquiry@kempersystem.com. Web: www.kemper-system.com/us/eng/.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
  1. PRODUCTS
     1. General: Materials shall be part of a Low Odor, pre-engineered, low VOC fully reinforced cold liquid applied polymeric resin waterproofing membrane system. Provide primers and other secondary materials that are produced or are specifically recommended by manufacturer of waterproofing system to ensure compatibility.
     2. Membrane: Kemperol 022 is a Two-component, cold fluid-applied reinforced waterproofing membrane with a 50 g/m2 polyester reinforcing fleece, for a finished dry film membrane thickness of .035 inch nominal per ply. Membrane shall have the following properties:
        1. Physical Properties: All times are approximate and depend upon air flow, humidity and temperature.
           1. Color: Gray
           2. Physical State: Cures to Solid
           3. Nominal Thickness: 35 mils
           4. Usage time: 25 minutes
           5. Solid to walk on after: 16 hours
           6. Surfacing to be applied: 16 hours
           7. Overburden May be Applied: 16 hours
           8. Crack spanning: 0.06 inch (1.5 mm)
     3. Membrane Flashings: Composite of the same resin material as field membrane with 50 g/m2 fleece reinforcement.
     4. Substrate Primer and Resin Additives:

\*\* NOTE TO SPECIFIER \*\* Select the one of the following two paragraphs as applicable for the system specified.

* + - 1. Polyurethane Primer: Kempertec D/R primer, two-component, solvent-free polyurethane resin for use in improving adhesion of membrane to wood, metal and bituminous substrate surfaces.
      2. Epoxy Primer: Kempertec EP/EP5 primer, two-component, solvent-free epoxy resin for use in improving adhesion of membrane to cementitious/masonry substrate surfaces.

\*\* NOTE TO SPECIFIER \*\* Select the accessories required for the project and the system specified and delete those that are not applicable.

* 1. ACCESSORlES
     1. Solvent-Based Cleaner for Tools and Membrane Tie-Ins: Methyl Ethyl Ketone (MEK) or acetone.
     2. Neutral PH Cleaner for Membrane.
     3. Caulking: Single component, non-sag elastomeric polyurethane sealant meeting ASTM C 920,Type S, Grade NS, Class 35 for use in sealing cracks and joints, and making watertight seals where required.

\*\* NOTE TO SPECIFIER \*\* The Waterproofing manufacturer recommends the following mortar bed and adhesive systems for use with the specified waterproofing system. Coordinate the following paragraphs with Section 09 32 00 - Mortar-Bed Tiling Floor and Wall Tile as required for the project. Delete not required.

* 1. TILE MORTAR BEDS AND ADHESIVES
     1. Latex-Modified Cementitious Mortar Adhesive: Portland cement-based mortar tile adhesive modified with liquid latex additive for improved adhesion and freeze-thaw resistance, as provided by the following manufacturers:
        1. Mapei's Kerabond/Keralastic Premium Flexible Tile Mortar.
        2. Laticrete's 211 Powder with Laticrete 4237 Latex Additive.
     2. Epoxy Setting Mortar: Two-component, solvent-free epoxy resin tile adhesive for improved adhesion and freeze-thaw resistance, as provided by the following manufacturers:
        1. Mapei's Kerapoxy 100 percent Solids Epoxy Setting Mortar.
        2. Laticrete's Latapoxy 100 percent Solids Epoxy Setting Mortar.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly prepared and conditions are suitable to proceed with the Work of this specification.
         1. Substrates shall be inspected and repaired as needed to provide a proper surface to receive waterproofing system.
         2. Verify substrate surface slopes to drain for horizontal waterproofing applications.
         3. Identify incompatible or unsatisfactory substrates, if any.
      2. Verify substrate openings, curbs, and protrusions through substrate are in place and solidly set.
      3. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. General: Surfaces to be prepared as a substrate for the new waterproofing system as follows:
         1. Determine the condition of the existing structural deck/substrate. All defects in the deck or substrate shall be corrected before new waterproofing work commences. Areas of deteriorated deck/substrate, porous or other affected materials must be removed and replaced with new to match existing.
         2. Prepare flashing substrates as required for application of new waterproofing membrane flashings.
         3. Inspect substrates, and correct defects before application of new waterproofing. Fill all surface voids greater than 1/8 inch wide with an acceptable fill material.
         4. Remove all ponded water, frost and/or ice from the work substrate prior to installing new waterproofing materials.
         5. Substrate for waterproofing shall be clean, dry, free of loose, spalled or weak material including coatings, mineral aggregate, and flood coat/gravel surfacing, oil, grease, contaminants, abrupt changes in level, waterproofing agents, curing compounds, and free of projections which could damage membrane materials.
      2. Structural Concrete:
         1. New concrete shall be cured a minimum of 28 days in accordance with ACI-308, or as approved by Roofing/waterproofing Manufacturer's on-site representative.
         2. Concrete shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products and previous waterproofing materials.
         3. Concrete shall be dry with a maximum moisture content of 5 percent. Installer shall perform periodic evaluations of moisture content during the work. Moisture evaluation results shall be submitted in writing to the Architect and waterproofing manufacturer on-site representative for acceptance.
         4. Where required, concrete shall be abrasively cleaned in accordance with ASTM D 4259 to provide a sound substrate free from laitance. Achieve an open concrete surface in accordance with ICRI surface profiles CSP 3-5. When using mechanical methods to remove existing roofing/waterproofing products or surface deterioration, the surface profile is not to exceed 1/4 inch (peak to valley).
         5. Substrate shall be sound and all spalls, voids and blow holes on vertical or horizontal surfaces must be repaired prior to placement of the primer coat. Spalls and other deterioration shall be repaired in accordance with the requirements of the Architect and Membrane manufacturer.
         6. Areas of minor surface deterioration of 0.25 inch (6 mm) or greater in depth shall be repaired to prevent possible pooling of the liquid applied materials, leading to excessive usage of primer and resin.
         7. For concrete materials with a compressive strength of less than 3,000 psi contact Roofing/waterproofing Manufacturer's Technical Department for substrate preparation requirements.
      3. Masonry:
         1. Masonry walls hard kiln dried brick or waterproof concrete block construction.
         2. Areas of soft or scaling brick or concrete, faulty mortar joints, or walls with broken, damaged or leaking coping shall be repaired in accordance with the requirements of the Architect and waterproofing Manufacturer.
      4. Steel/Metal:
         1. Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3, Power Tool Cleaning, or as required by Roofing/waterproofing Manufacturer. Extend preparation a minimum of 1 inch beyond the termination of the membrane flashing materials.
         2. In addition to cleaning, all metal surfaces shall be abraded to provide a rough open surface. A wire brush finish is not acceptable.
      5. Wood/Plywood:
         1. Plywood shall be identified with American Plywood Association (APA) grade trade marks and meet the requirements of Product Standard PS1. Strip plywood joints with 4 inch wide strips of flashing membrane. Cover knot holes or cracks with strips of flashing membrane.
      6. Cement Board: Strip Cement Board joints with membrane
      7. Other Surfaces:
         1. Remove all contaminants as required by membrane manufacturer. Surface preparation shall be performed by means approved by Architect and waterproofing Manufacturer.
      8. Finish Leveling, Patching and Crack Preparation:
         1. General: 022 sand mix is the preferred material for all concrete and masonry substrate finish leveling, crack and wall/deck preparation and patching. 022 resin/sand patching does not require surface grinding.
         2. Concrete and Masonry Substrate Leveling and Patching: Substrate conditions are to be evaluated by the installer, the Architect, and Membrane manufacturer. Perform leveling and patching operations as follows:
            1. Level uneven surfaces with a leveling mixture of resin and approved kiln-dried silica sand in a 1:2 resin to sand ratio by volume. Spread and plane this compound with a squeegee and trowel to achieve a flat surface.
            2. Fill cavities with a patching mixture of resin and approved kiln-dried sand in a 1:4 primer to sand ratio by volume.
            3. Silica sand must be kept absolutely dry during storage and handling.
            4. Any surface to be leveled or filled must first be primed with an appropriate primer.
         3. Joint and Crack Preparation: Joints, cracks and fractures in the structural deck/substrate shall be prepared as prior to installation of the waterproofing membrane to prevent telegraphing through the waterproofing membrane.
            1. Non-Moving Cracks, Joints, and Voids: Clean out crack/ joint by brushing and oil-free compressed air. Fill crack/joint with polyurethane sealant. Voids require the installation of backer rod or other backing material prior to application of the polyurethane sealant. Allow for a minimum of 12 hours cure or as required by sealant manufacturer.
            2. Moving Cracks: Clean out crack by brushing and oil-free compressed air. Fill crack with polyurethane sealant. Allow for a minimum of 12 hours cure or as required by sealant manufacturer. Following full curing of primer, apply waterproofing resin and a 4 inch (10 cm) wide strip of membrane (resin and fleece) in strict accordance with Membrane manufacturer's written instructions.

\*\* NOTE TO SPECIFIER \*\* Select the primer required from the following paragraphs as required for the system specified. Delete if not applicable. Note that concrete, cement boards, wood and metal surfaces do not require primer application. For gypsum and plaster substrates please review manufacturer's current primer recommendations.

* 1. PRIMER APPLICATION
     1. General:
        1. Concrete, cement boards, wood and metal surfaces do not require primer application. For gypsum and plaster substrates please review manufacturer's current primer recommendations.
        2. Mix and apply primer in strict accordance with written instructions of Membrane Manufacturer.
        3. Substrate surface must be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth wipe or a combination of methods.
        4. Do not apply primer on any substrate containing asphalt, coal-tar pitch, creosote or penta-based materials unless approved in writing by Membrane Manufacturer. Some substrates may require additional preparation before applying primer.
     2. Mixing of Kempertec EP and Kempertec D Primers:
        1. Premix primer Component A thoroughly with a spiral agitator or stir stick. Pour entire unit of primer Component B into entire unit of primer Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. DO NOT AERATE. Primer solution should be a uniform color, with no light or dark streaks present.
        2. Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.
        3. Mix only full units of primer. Primer pot life is approximately 30 minutes.
     3. Mixing of Kempertec EP5 Primer:
        1. Premix primer Component A thoroughly with a spiral agitator or stir stick. Pour entire unit of primer Component B into entire unit of primer Component A and mix the components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. DO NOT AERATE. The Primer solution should be a uniform color, with no light or dark streaks present.
        2. Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.
        3. Mix only full units of primer. Primer pot life is approximately 20 minutes.
     4. Mixing of Kempertec R Primer:
        1. Premix primer Component A within clear pouch to obtain consistent appearance. Remove separation cord. Knead primer Component B into Component A and mix the components for approximately 1 minute. The Primer solution should be a uniform color, with no light or dark streaks present.
        2. Do not thin primer. Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.
        3. Mix only full units of primer. Primer pot life is approximately 5-10 minutes.
     5. Application:
        1. After mixing, apply the primer with a roller or brush evenly onto the surface in a cross directional method, or utilizing the pour and spread method to fully cover the substrate.
        2. Porous substrates may require an adjustment to the primer application rate or multiple coats to achieve proper pore saturation.
        3. For EP and EP5 Primer applications, broadcast Kemperol Surfacing sand (0, #18) at the rate of 50 lbs. / 100 ft2 into the wet primer to increase surface area and enhance adhesion. Remove excess sand after primer has fully cured prior to membrane application.
        4. Curing time is approximately 12-16 hours for D and EP primers and approximately 3-4 hours for R and EP5 primers. Kemperol membrane may be applied when the primer is completely dry and without tack. Do not apply Kemperol membrane to tacky or wet primer.
        5. Exposure of primer in excess of 8 days or premature exposure to moisture may require abrasion of contaminated surface and application of new primer coat.
  2. MEMBRANE APPLICATION
     1. General:
        1. Where primer is necessary, apply the waterproofing membrane immediately following full curing of the primer in order to obtain the best bond between primer and membrane.
        2. Mix and apply cold fluid-applied reinforced waterproofing membrane in strict accordance with written instructions of Membrane Manufacturer. Use only proprietary membrane resins and materials, as supplied by the membrane manufacturer.
        3. Substrate surface shall be dry, with any remaining dust or loose particles removed using clean, dry, oil-free compressed air, industrial vacuum, cloth-wipe or a combination.
        4. Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work for 16 hours or until fully cured. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.
     2. Mixing of Kemperol 022 Resin:
        1. Mix only full units of resin. Breaking down units is not acceptable.
        2. Mix resin Component A with a spiral agitator until the liquid is a uniform color.
        3. Pour entire contents of resin Component B into Component A and thoroughly mix the components with a spiral agitator. Resin solution should be a uniform color, with no light or dark streaks present.
        4. Resin pot life is approximately 25 minutes.
     3. Application of Resin/Fleece:
        1. After the Resin is mixed, using a Kemperol roller nap or brush, apply 2/3 of the resin liberally and evenly onto the surface. Covering one working area at a time, between 10 - 15 sq.ft.
        2. Roll the Kemperol Fleece directly into the resin, making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding folds and wrinkles. The fleece will begin to rapidly saturate with the liquid resin mix. Use the roller or brush to work the resin into the fleece, saturating from the bottom up, and eliminating air bubbles, wrinkles, etc. It is important to correct these faults before the resin cures. White spots are indications of unsaturated fleece or lack of adhesion.
        3. Apply the remaining 1/3 of the resin to the top of fleece to complete the saturation. Rolling the final coat of resin onto the fleece should result in a glossy appearance. The fleece can only hold so much resin and all excess should be rolled forward to the unsaturated portion of the fleece. The correct amount of resin will completely saturate the fleece. Work wet membrane to avoid any blisters, openings, or lifting at corners, junctions, and transitions. Always assure full resin saturation of fleece.
        4. Prevent contact between mixed/unmixed resin and new/existing membrane. If any unmixed resin contacts membrane surface remove immediately and clean thoroughly with a cloth rag.
        5. At all fleece seams, allow a 2 inch (5 cm) overlap for all side joints and a 4 inch (10 cm) overlap for all end joints.
        6. While the resin is still wet, broadcast kiln-dried silica Surfacing sand at the approximate rate of 30 lbs./100 sq.ft (1.5 kg/sm)
  3. FLASHING APPLICATION
     1. General:
        1. Install flashing system in accordance with the requirements/recommendations of the Membrane manufacturer and as indicated on the manufacturer's standard drawings. Provide system with base flashing, edge flashing, penetration flashing, and all other flashings required for a complete watertight system.
        2. Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.
        3. Fleece shall overlap 2 inches (5 cm) minimum for all joints. Fleece shall be cut neatly to fit all flashing conditions without a buildup of multiple fleece layers. Work wet membrane with a brush or roller to eliminate blisters, openings, or lifting at corners, junctions, and transitions.
        4. Install membrane flashings concurrently with the waterproofing membrane as the job progresses. Should any water penetrate the new waterproofing membrane because of incomplete flashings, the affected area shall be removed and replaced at the contractor's expense.
        5. Flashing height shall be at least as high as the potential water level that could be reached. All flashings shall be terminated as required by the Membrane Manufacturer.
     2. Pipes, Conduits, and Unusually Shaped Penetrations:
        1. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. Provide a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.
     3. Drains:
        1. Acceptable drain materials are pvc, cast iron, cast aluminum, and copper.
        2. Replace all broken or damaged parts of existing drains.
        3. Flashing material shall extend 4 inches minimum onto drain or scupper flange and into drain/ scupper body.
     4. Hot Stacks:
        1. Protect the membrane components from direct contact with steam or heat sources when the in-service temperature exceeds 170 degrees F. In all such cases flash to an intermediate "cool" sleeve.
        2. Fabricate "cool" sleeve in the form of a flanged metal cone using galvanized metal, mechanically attached to the structure or wood nailers.
        3. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.
     5. Flexible Penetrations:
        1. Provide a weathertight gooseneck of round cross-section for each penetration or group of penetrations. Set in water cut-off mastic and secure to the structural substrate.
        2. Flashing is typically constructed as a two part assembly consisting of a vertical wrap and a horizontal target patch. There must be a minimum of a 2 inch (5 cm) overlap between vertical and horizontal flashing components.
     6. Walls, Curbs and Base Flashings:
        1. Wall, curb and base flashings shall be installed to solid substrate surfaces.
        2. Reinforce all transition locations and other potential wear areas with a 4 inch wide membrane strip evenly positioned over the transition prior to installing the exposed flashing layer.
        3. Reinforce all inside and outside corners with a 4 inch diameter conical piece of membrane prior to installing the exposed flashing layer.
        4. All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.
        5. Extend flashing a minimum of 4 inches onto the field substrate surface.
  4. FIELD QUALITY CONTROL
     1. Substrate and Bond Testing

\*\* NOTE TO SPECIFIER \*\* Delete the following cementitious testing paragraph if not applicable.

* + - 1. Evaluate moisture content of on-site cementitious substrate materials. Determine substrate moisture content throughout the work and record with Daily Inspection Reports to the Owner or designated Representative, and Membrane Manufacturer. Report the results of the following tests.
         1. Tramex Concrete Moisture Encounter Meter CME4 to determine the moisture content of the top 3/4 inch of the concrete slab. Maximum acceptable reading 5 percent.
         2. Anhydrous Calcium Chloride Test. Maximum result 3 lb / 1,000 ft2 of area per 24-hour period.
         3. Laboratory Determination Moisture Content. Maximum result 6 percent by weight.
         4. Relative Humidity (RH) Test. Maximum RH 75 percent.
         5. Frothing, bubbling, or pinholes within the primer indicates excessive vapor drive from within the substrate. Blistering of membrane may result from excessive vapor drive.
         6. Where results exceed the maximum acceptable reading contact Membrane Manufacturer for recommendations.
      2. Conduct random on-site tests to determine tensile bond strength of membrane to substrate using an Elcometer Adhesion Tester Model 106 or similar device, or by the performance of a manual pull test. Perform tests at the beginning of the Work, and at intervals as required to assure specified adhesion with a minimum of 3 tests per 5000 square feet. Smaller areas shall receive a minimum of 3 tests. Submit daily test results to the Owner or his designated Representative and the Membrane Manufacturer. Immediately notify the Owner or designated Representative and Membrane Manufacturer in the event bond test results are below specified values.
         1. For typical applications not subject to vehicular traffic, adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 150 psi (1.0 N/mm2), as determined by use of an adhesion tester.
         2. Adequate surface preparation will be indicated by 135 degree peel bond strength of membrane to substrate such that cohesive failure of substrate or membrane occurs before adhesive failure of membrane/substrate interface.
         3. In the event the bond strengths are less than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation.
  1. CLEANING
     1. Clean-Up: Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be restored to preconstruction condition.
     2. Waterproofing materials, components and accessories shall be removed from Site and taken to a legal dumping area authorized to receive such materials.
     3. Disposal of Primer and Resin: Cured resin may be disposed of in standard landfills. Uncured resin is considered a hazardous material and must be handled as such, in accordance with local, state and federal regulation
  2. PROTECTION
     1. Protect building components with tarps or other suitable materials, from soil, stains, or spills at areas of application.
     2. Any such damage shall be repaired at Contractor's expense to Owner's satisfaction or be restored to original condition.

END OF SECTION