

KEMPEROL BR/BR-M/V210/V210-M SYSTEM APPLICATION PROCEDURES

DESIGN EVALUATION

Review project specification to ensure conformance with Kemper System, Inc. (KSI) requirements. Notify design professional and Kemper System, Inc. technical department of any discrepancies prior to the performance of any work.

Evaluate site and building conditions. It is recommended that test cuts and test cores be performed to determine the layer-by-layer composition of the substrate assembly that the KSI materials will be applied over. Excessive moisture within the substrate assembly, including the presence of an entrapped waterproofing membrane in a split slab condition, is likely to result in blistering of the KSI materials.

MATERIAL STORAGE

All KSI components will be delivered to the site in original sealed containers/packaging. Define a storage area for all components that is cool, dry, out of direct sunlight, and in accordance with recommendations of KSI and relevant regulatory agencies. Roll goods must be stored horizontally on platforms sufficiently elevated to prevent contact with water and other contaminants. DO NOT use rolls with damaged ends. Store solvent-bearing solutions, resins, additives, inhibitors or adhesives in accordance with the MSDS and/or local fire and regulatory authorities. Materials should not be stored in quantities that will exceed design loads, damage substrate materials, hinder installation or drainage.

Optimum storage of materials is between 65 and 70 °F (18-21 °C) in a controlled environment to facilitate mixing and fleece saturation. DO NOT store materials outside in cold weather, as the cooled materials will be difficult to mix and apply due to their thick consistency. DO NOT store materials outside in hot weather, as the heated materials will react too quickly and reduce working times significantly.

WORK PLACE SAFETY

Provide and maintain positive ventilation and protection to workers for concealed and/or interior application or applications lacking sufficient natural air movements. Protect air intake path(s) of the building to prevent odor infiltration to the building interior. Coordinate protective measures with the Owner or his designated Representative.

Comply with requirements of OSHA, NIOSH or governing local authority for work place safety. When required, provide barricades, retaining ropes, safety elements (active/passive) and any appropriate signage required by OSHA, NIOSH, and NSC and/or the Owner or his designated Representative. Contractor must be familiar with and observe OSHA Regulations CFR 1926/1910 (current issue) for use and handling of polyester resins, catalysts (organic peroxide).

Note: Copies of all current MSDS for all components must be kept on site. Provide all crewmembers with appropriate safety data information and training as is related to the specific chemical compound he or she may be expected to deal with. Each crewmember shall be fully aware of first-aid measures to be undertaken in case of accidents.

ENVIRONMENTAL REQUIREMENTS

Application of Kemperol materials may proceed while air temperature is between 35 and 105 °F (2-41 °C) providing the substrate is a minimum of 5 degrees above the dew point. Consult with KSI outside of this temperature range. Do not commence with the application of any Kemperol material during or with the threat of inclement weather and ensure that substrate materials are dry and free of contaminants.

PROTECTION

Protect building adequately (with tarp or other suitable material) from soil, stains, or spills at all hoisting points and areas of application. Provide protection for Contractor personnel and occupants of the structure and surrounding buildings as required complying with requirements of OSHA, NIOSH and/or governing local authority.

ODOR CONTROL

Where required by the Owner or his designated Representative, implement odor control and elimination measures before and during the application of the roofing/waterproofing materials. Control/elimination measures must be field tested at off-hours and typically consists of one (1) or multiple of the following measures:

1. Sealing of air intakes with activated carbon filters, and at joints against building exterior walls to prevent leakage of unfiltered air into occupied spaces.
2. Erection and use of moveable enclosure(s) sized to accommodate work area(s) and stationary enclosure for resin mixing station equipped with mechanical air intake/exhaust openings, odor control air cleaners, and activated carbon filter at exhaust openings as required to clean enclosed air volume and to prevent odor migration outside the enclosure. Placement of odor elimination stations inside and outside of the enclosure(s) as required.

SYSTEM APPLICATION

The KSI Kemper System is a four-step application:

1. Preparation and cleaning of the substrate;
2. Application of primer suitable for substrate;
3. Application of the membrane;
4. Application of surfacing.

Immediately before the application of any component of the system, the substrate 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.

Note: Before opening the containers of any Kemperol material, protect hands and wrists with gauntlet-style neoprene gloves, and wear OSHA-approved eye protection. Use respiratory equipment if recommended by MSDS sheet for specific Kemperol material being applied.

SYSTEM ASSEMBLIES

Kemper System, Inc. materials are often installed in roofing and waterproofing assemblies that utilize additional materials not discussed in this Application Guide, including: asphaltic base and cap sheets; polyisocyanurate and extruded polyurethane foam insulation; asphaltic, treated gypsum, and cementitious cover boards; drainage mats; water retention mats; concrete pavers; landscape-type overburden. Please refer to individual Kemper System, Inc. guide specifications for application information regarding the incorporation of these materials into a Kemper System assembly.

SUBSTRATE PREPARATION

Concrete

New concrete shall have cured a minimum of 28 days in accordance with ACI-308, or as approved by Waterproofing Manufacturer's Technical Department. New or existing concrete shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, bituminous products and previous waterproofing materials. New or existing concrete shall be dry with a maximum moisture content of five (5) percent. Where required, concrete shall be abrasively cleaned in accordance with ASTM D4259 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 waterproofing products or surface deterioration, the surface

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profile is not to exceed 1/4 inch (peak to valley). The 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. Areas of minor surface deterioration of 0.25" (6 mm) or greater in depth shall be repaired to prevent possible ponding of the system, leading to excessive usage of primer and resin. For concrete materials with a compressive strength of less than 3,500 psi contact Waterproofing Manufacturer Technical Department for substrate preparation requirements.

Masonry

Walls shall be built with hard kiln dried brick or waterproof concrete block construction. Areas of soft or scaling brick or concrete, recessed or faulty mortar joints, or walls with broken, damaged or leaking coping shall be repaired prior to placement of the primer coat. Repair in a manner previously described for structural concrete repair. Walls shall be dry with a maximum moisture content of five (5) percent.

Steel/Metal

Clean and prepare metal surfaces to near white metal in accordance with SSPC - SP3 (power tool clean) or as required by membrane manufacturer. Extend preparation a minimum of three (3) inches beyond the termination of the membrane flashing materials. Notch steel surfaces to provide a rust-stop. In addition to cleaning, all metal surfaces shall be abraded to provide a rough open surface. A WIRE BRUSH FINISH IS NOT ACCEPTABLE. Wipe prepared metal surface with MEK or other acceptable solvent cleaner prior to application of primer.

Wood/Plywood

Plywood shall be identified with American Plywood Association (APA) grade trademarks and shall meet the requirements of product standard PS1. Strip plywood joints with four inch (4") wide strip of KEMPEROL® membrane. Cover knot holes or cracks with strips of KEMPEROL® membrane.

Existing Asphaltic Bituminous Waterproofing

Existing flashings shall be removed down to the structural substrate/penetration at all flashing areas. Existing roofing shall be removed down to the structural deck, or prepared as a substrate for the new waterproofing system, as per project requirements. Damaged areas of existing roofing membrane shall be removed and replaced, or repaired, with granule-surfaced modified bitumen membrane. Smooth-surfaced membrane with applied coating shall have all loose coating removed. The suitability of the remaining coating as a substrate for the new waterproofing system shall be contingent on the written approval by Waterproofing Manufacturer's Technical Department. The application of a granule-surfaced modified bitumen membrane may be required. Granule-surfaced membrane shall have all loose granules removed from the surface by vacuuming and power brooming. Gravel-surfaced membrane shall have all flood coat and gravel removed to the top ply. The suitability of the ply sheets as a substrate for the new waterproofing system shall be contingent on the written approval by Waterproofing Manufacturer's Technical Department. The application of a granule-surfaced modified bitumen membrane may be required.

Other Substrate Surfaces

Remove all contaminants as required by membrane manufacturer. Surface preparation shall be performed by means approved by Owner or his designated Representative.

SUBSTRATE LEVELING, PATCHING, AND REPAIRING

Kemperol primer/sand mix are the preferred materials for all substrate leveling, crack and wall/deck repair and patching. Kemperol primer/sand mix is not intended to be used as a structural repair material.

Commercially-available cementitious repair mortars can also be used to make surface repairs to concrete, masonry, stone, and terra cotta substrate surfaces. Commercially-available single-component, gun-grade polyurethane sealant can be used to fill and seal defects in wood and metal substrate surfaces. Gaps between materials are typically filled by the use of compressible backer rod, followed by application of polyurethane sealant.

A sound and even substrate surface shall be provided for all KSI material applications. Kemperol materials are not intended to span unsupported gaps and voids.

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Resin and Primer Options

Kemperol EP or D primer/sand patching mix allows patching to be conducted as part of the priming operation. Kemperol membrane may be applied following an 8-12 hour curing period. EP Primer is recommended for repairs to concrete and masonry surfaces; D Primer is recommended for repairs to metal and wood surfaces.

Kemperol EP5 or R quick-dry primer/sand patching mix allows patching to be conducted as part of the priming operation. Kemperol membrane may be applied following a 3-4 hour curing period. EP5 Primer is recommended for repairs to concrete and masonry surfaces; R Primer is recommended for repairs to metal and wood surfaces. Recommended for vertical repairs due to fast-set time. In addition, recommended for creating slope to drain to address localized drainage deficiencies.

Sand Aggregate Specification and Size

All sand must be washed; kiln-dried and dust-free suitable for troweling, broadcast or pourable self-leveling, round grain or angular sized as follows:

For voids less than 1" in depth:	#00 sand (0.3 - 0.6 mm)
For voids 1" to 2" in depth:	#0 sand (0.5 - 1.2 mm)

Silica sand must be kept absolutely dry during storage and handling.

Substrate Leveling, Sloping and Patching

Substrate conditions are to be evaluated by the Contractor, the Owner, or his designated Representative, and Kemper System.

Note: Any surface to be leveled or patched must first be primed with an appropriate Kemperol primer.

The ratio of resin/primer to sand can be varied to create a mixture that provides the proper consistency for the intended application.

The leveling mixture typically consists of a slurry of primer and approved kiln-dried silica sand in a 1:2 resin/primer to sand ratio *by volume*. Spread and plane this compound with a squeegee and trowel to achieve a flat surface.

The patching mixture typically consists of a mortar of primer and approved kiln-dried sand in a 1:3/1:3.5 resin/primer to sand ratio *by volume*. Fill cavities with this compound with a trowel to achieve a flat surface.

The sloping mixture typically consists of a mortar of primer and approved kiln-dried sand in a 1:3/1:3.5 resin to sand ratio *by volume*. Create required slope (maximum 2" thickness in maximum 1" lifts) with a trowel to achieve an even surface.

Preparation of Joints and Cracks

Joints, cracks, and fractures in the structural deck shall be prepared as defined below before installation of water-proofing membrane. Note: Joints, cracks, and fractures may telegraph through the waterproofing membrane.

Non-Moving Cracks

Determine that crack is non-moving. Clean out crack by brushing and oil-free compressed air. Fill crack with Kemperol resin/sand mix, primer/sand mix, or polyurethane sealant. Allow for a minimum of twelve (12) hours cure or as required by Sealant Manufacturer.

Moving Cracks

Determine that crack is moving. Clean out crack by brushing and oil-free compressed air. Fill crack with resin/sand mix, primer/sand mix, or polyurethane sealant. Allow for a minimum of twelve (12) hours cure or as required by Sealant Manufacturer. Apply resin and 4-inch (10 cm) wide strip of membrane (resin and fleece) over crack in strict accordance with Kemper System's written instructions.

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FINAL SUBSTRATE INSPECTION

All surfaces must be free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, release agents, lacquers, or any other condition that would be detrimental to adhesion of the primer and substrate. This requires careful preparation of existing horizontal and vertical substrates; cracks are filled, expansion joints are prepared, flashings are removed or modified, and termination points are determined. Substrates and penetrations are prepared to rigorous industry standards, and may require scarifying, sandblasting or grinding in some cases to achieve a suitable substrate.

The Contractor should perform random tests to determine tensile bond strength of membrane to substrate at the job site using an Elcometer Adhesion Tester Model 106 or similar device, or by the performance of a manual pull test. Contractor shall perform tests on completely cured membrane at the beginning of the Work, and at intervals as required assuring specified adhesion with a minimum of three (3) tests per 5000 ft² (464.5 m²).

KSI requires a tested tensile bond strength of membrane to substrate greater than or equal to 220 psi (1.5 N/mm²). Alternatively, a manual 135° peel bond strength of membrane to substrate must confirm that cohesive failure of substrate or membrane occurs before adhesive failure of primer/substrate interface.

This can be achieved through correct and proper surface preparation. Before priming of the surfaces, inspect and check the prepared substrate.

In the event the bond strengths are lower than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation. Contractor shall immediately notify the KSI in the event tensile bond test results are below specified values.

PRIMER MIXING AND APPLICATION

Mixing of Standard D and EP Primers

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick.

Step 2: Pour resin Component B into 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. DO NOT THIN PRIMER. The Resin solution should be a uniform color, with no light or dark streaks present.

NOTE: Mix only that amount of resin Components A & B that can be used in 20-30 minutes. DO NOT break down workpacks into smaller quantities - mix the entire workpack.

Mixing of Standard D and EP Primer Sachets

Step 1: Remove bag from the aluminum packaging. Knead cream-colored resin Component A thoroughly until a uniform color is achieved.

Step 2: Pull away the rubber cord separating the two components so that Components A and B can be mixed together. Knead the bag quickly and thoroughly for approximately 1 minute so that a homogenous primer is formed. The primer should be a uniform color, with no light or dark streaks present.

NOTE: Mix only that amount of sachets that can be used in 15-20 minutes.

Mixing of Quick Dry EP5 Primer

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick.

Step 2: Pour resin Component B into 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. DO NOT THIN PRIMER. The Resin solution should be a uniform color, with no light or dark streaks present.

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NOTE: Mix only that amount of resin Components A & B that can be used in 15-20 minutes. DO NOT break down workpacks into smaller quantities - mix the entire workpack.

Mixing of Quick-Dry R Primer Sachet

Step 1: Remove bag from the aluminum packaging. Knead cream-colored resin Component A thoroughly until a uniform color is achieved.

Step 2: Pull away the rubber cord separating the two components so that Components A and B can be mixed together. Knead the bag quickly and thoroughly for approximately 1 minute so that a homogenous primer is formed. The primer should be a uniform color, with no light or dark streaks present.

NOTE: Kemperol R primer is extremely fast curing. Excessive mixing time reduces the available working time for the primer. Apply primer within 5 minutes.

Mixing of BSF-R Primer

Step 1: Premix resin with a clean spiral agitator or stir stick until a uniform consistency is obtained. DO NOT AERATE. DO NOT THIN PRIMER.

NOTE: Premix only that amount of resin that can be used in 1 hour to prevent development of skin on top of resin.

Mixing of Quick-Dry AC Primer

Premix primer Component A thoroughly with a clean spiral agitator or stir stick.

Determine the correct amount of catalyst Component B based upon ambient temperature in accordance with written instructions of Membrane Manufacturer.

Add primer catalyst Component B into 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. DO NOT THIN PRIMER. The Primer solution should be a uniform color, with no light or dark streaks present.

NOTE: Mix only that amount of primer Components A & B that can be used in 15 minutes. DO NOT break down workpacks into smaller quantities - mix the entire workpack.

Primer Application

Determine required primer coverage for each substrate material/condition and apply in strict accordance with written instructions of Membrane Manufacturer.

After the Primer resin is mixed, apply approximately 0.7 - 1.4 gallons (2.65-5.30L) per 100 square feet (9 m²). The higher application rate is primarily for EP and EP5 primers applied to concrete and masonry substrates that require additional primer to achieve pore saturation. The Resin should be rolled or brushed evenly onto the surface to fully saturate the substrate in one application.

For EP and EP5 Primer applications only, broadcast #0 (0.5-1.2 mm) kiln-dried sand at the rate of 50 lbs. per 100 SF into the wet primer to enhance membrane/primer bond. Remove excess sand after primer has fully cured prior to membrane application.

Curing time is approximately 8-12 hours for standard D and EP primers, approximately 3-4 hours for quick-dry R and EP5 primers, approximately 4-5 hours for BSF-R primer, and approximately 1 hour for quick-dry AC primer. Kemperol membrane may be applied when the primer is completely dry and without tack. Do not apply Kemperol membrane to tacky or wet primer.

Note: Exposure of primer in excess of eight (8) days or premature exposure to moisture may require removal and application of new primer. Primer application past the Kemperol membrane terminations requires surfacing with an approved material.

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Temporary Waterproofing: For waterproofing operations requiring removal of the existing waterproof membrane system, application of the primer may be used as temporary waterproofing of solid, continuous substrates such as concrete prior to application of the Kemperol membrane and specified overburden/surfacing. Multiple applications and surfacing with broadcast of kiln-dried silica sand may be required. Observe application and exposure limitation of primer. **TEMPORARY WATERPROOFING SHALL NOT BE APPLIED TO EXPOSED INSULATION AND COVER BOARD MATERIALS.**

KEMPEROL RESIN MIXING AND APPLICATION

Mixing of BR/V210 Two-Component Resin

Step 1: Mix resin Component A (black formulation) with a spiral Kemperol agitator, until the liquid is a uniform black color.

Step 2: Add the Catalyst Powder to resin Component A and mix with the same agitator for 5 minutes or until the powder is completely mixed. The dissolving time is 20 minutes to 2 hours, depending on the ambient temperature. The catalyst is completely dissolved when there are no white specks remaining.

Step 3: Mix resin Component B (white formulation) with a separate spiral agitator until the color is a uniform white. If the ambient temperature is below 50 °F (10 °C) or above 75 °F (23.9 °C), then a weather related additive should be combined and mixed into the Component B.

Kemperol Cold Activator should be added to resin Component B when the ambient temperature is below 50 °F (10 °C). The activator should be mixed with the spiral agitator for 5 minutes or until both liquids are thoroughly blended.

Kemperol Inhibitor should be added to resin Component B when the temperature exceeds 75 °F (23.9 °C). The inhibitor should be mixed with the spiral agitator for 5 minutes or until both liquids are thoroughly blended.

Step 4: Pour resin Component A and Component B into a third clean bucket at a 1:1 ratio (equal parts) and thoroughly mix the components with a clean spiral agitator. The Resin solution should be a uniform color, with no light or dark streaks present.

Note: Mix only that amount of resin Components A & B that can be used in 15 -20 minutes.

Mixing of BR-M/V210-M Single-Component Resin

Step 1: Mix resin with a spiral Kemperol agitator until the liquid is a uniform color, with no light or dark streaks present.

Step 2: If the ambient temperature is below 50 °F (10 °C) or above 75 °F (23.9 °C), then a weather related additive should be combined and mixed into the liquid resin.

Kemperol Cold Activator should be added to the liquid resin when the ambient temperature is below 50 °F (10 °C). The activator should be mixed with the spiral agitator for 5 minutes or until both liquids are thoroughly blended.

Kemperol Inhibitor should be added to the liquid resin when the temperature exceeds 75 °F (23.9 °C). The inhibitor should be mixed with the spiral agitator for 5 minutes or until both liquids are thoroughly blended.

Step 3: Add the Catalyst Powder to the mixed liquid resin and mix with the same agitator for 5 minutes or until the powder is completely mixed. It is not necessary to wait for the catalyst powder to dissolve before using the resin.

Note: Mix only that amount of resin that can be used in 15 -20 minutes. DO NOT break down workpacks into smaller quantities - mix the entire workpack.

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Resin/Fleece Application

Step 1: After the Resin is mixed, apply approximately 4.5 gallons (16.9L) per 100 square feet (9 m²). The Resin should be rolled or brushed evenly onto the surface. Apply liberally to the prepared surface with a roller or brush using a broad, even stroke. Cover one working area at a time, between 15-20 sq. ft.

Step 2: Then roll the Kemperol Fleece directly into the Resin, making sure the SMOOTH SIDE IS FACING UP (natural unrolling procedure), avoiding any folds and wrinkles. Use a medium nap roller or brush to work the resin into the fleece, saturating from the bottom up. The appearance of the fleece should be light opaque amber with no white spots. White spots are indications of unsaturated fleece or lack of adhesion. It is important to correct these faults before the resin cures.

Step 3: Apply approximately 2 gallons (7.5L) per 100 square feet (9 m²) additional liquid resin mix on top of fleece until fully saturated and continue to work resin. The topcoat layer of Resin should finish the saturation of the fleece. Roll this final coating into the fleece, which will result in a glossy appearance. The fleece can only hold so much resin and all excess should be rolled forward to the unsaturated fleece. Any excess resin left on the top of the fleece will weather and peel off. The correct amount of Resin will completely saturate the Fleece and no white color will be visible.

Note: Prevent contact between mixed/unmixed resin, new membrane or old (remaining) membrane. IF ANY UNMIXED RESIN contacts membrane surface remove immediately and clean thoroughly with a cloth rag.

Tool Use and Care

Brushes and rollers will remain supple and usable if they are kept moving in liquid resin. If allowed to sit, they will harden quickly as resin begins to cure. Rollers must be discarded once they stiffen. Brushes may be discarded or cleaned with MEK or acetone-based solvent. Roller handles can also be cleaned with MEK or acetone-based solvent. If solvent is used, the tool must air dry for twenty-four (24) hours before being reused for mixing and/or application. To minimize cleaning, wipe handle with clean, dry cloth every fifteen (15) to twenty (20) minutes and schedule work to avoid stopping.

Laps, Seams and Tie-offs

At all fleece seams, allow a 2" (5 cm) overlap for all side joints and a 4" (10 cm) overlap for all end joints. At membrane tie-offs, clean in-place membrane with MEK when resin has cured. Allow solvents to fully evaporate before application of new resin. DO NOT PRIME EXISTING KEMPEROL MEMBRANE.

Flashings

Install membrane flashings in accordance with the requirements/recommendations of KSI and as depicted on standard drawings and details. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system. Work wet membrane to avoid any blisters, openings, or lifting at corners, junctions, and transitions. Assure full resin saturation of fleece.

Curing and Staging

Polyester resins cure most quickly and completely when exposed to UV light. For nighttime, concealed and/or interior applications where exposure to natural light cannot be obtained, exposure to a UV light source or a supplemental source of hot air blown over the membrane surface will improve membrane cure.

Once the Kemperol membrane is in place, a minimum of one hour exposure at a distance of 24 inches (from the surface of the membrane to the face of the protective grill) using a UV source that casts a minimum of 6.5% UV-B is recommended.

Protect all areas where membrane has been installed. Do not work off installed membrane during application of remaining work before forty-eight (48) hours of curing. Movement of materials and equipment across installed membrane is not acceptable. If movement is necessary, provide complete protection of affected areas.

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KEMPEROL FLASHING APPLICATION

General

Wherever possible, install the flashings before installing the field membrane to minimize foot traffic over newly installed field membrane.

All membrane flashings shall be installed concurrently with the waterproofing membrane as the job progresses. Temporary flashings are not allowed without prior written approval from the Membrane manufacturer. 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.

Provide a minimum vertical height of 8" for all flashing terminations. Flashing height shall be at least as high as the potential water level that could be reached as a result of a deluging rain and/or poor slope. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.

Metal Flashing - General

Metal flashings shall be fabricated in accordance with the current recommendations of SMACNA and in accordance with standard drawings and project details.

Metal flashing flanges to which membrane is to be bonded shall be a minimum of four (4) inches in width, and secured to the substrate six (6) inches on center staggered with fasteners appropriate to the substrate type. The flanges shall be provided with a roughened surface that has been cleaned of all oil and other residue.

Metal edges that will be overlaid with membrane shall be provided with a 1/4" min. hemmed edge.

Apply primer, resin and fleece to metal flange, extending membrane to outside face of metal edging, and to vertical face of metal base/curb flashing.

Membrane Flashing - General

Membrane flashings shall be fabricated with primer appropriate for the substrate surface, resin of the same base chemical type as the field membrane, and fleece of the same weight as the field membrane unless specified otherwise.

Primer, resin, and fleece mixing and application methods as specified for field membranes are also suitable for membrane flashing.

Fleece shall overlap 2" (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.

Pipes, Conduits, and Unusually Shaped Penetrations

Flash all penetrations using cold fluid-applied reinforced unsaturated polyester waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.

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 two (2) inch (5 cm) overlap between vertical and horizontal flashing components.

Drains and Scuppers

Acceptable drain and scupper materials are cast iron, cast aluminum, and copper.

Connect new drains and scuppers to existing storm sewer system.

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Alternatively, replace all broken or damaged parts of existing drains and scuppers, or provide and install an acceptable insert.

Flash drains and scuppers using cold fluid-applied reinforced unsaturated polyester waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.

Flashing material shall extend four (4) inches minimum onto drain, scupper, or insert flange.

Install clamping ring if provided as part of the drain or scupper design. Install a strainer basket to prevent debris from clogging the drainage line.

Hot Stacks

Protect the membrane components from direct contact with steam or heat sources when the in-service temperature exceeds 150 degrees F. In all such cases flash to an intermediate "cool" sleeve.

Fabricate "cool" sleeve in the form of a metal cone using galvanized metal in accordance with Membrane manufacturer's details.

Flash all penetrations using cold fluid-applied reinforced unsaturated polyester waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.

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 two (2) inch (5 cm) overlap between vertical and horizontal flashing components.

Flexible Penetrations

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.

Acceptable gooseneck material is copper, of a sheet weight appropriate for the application.

Flash all penetrations using cold fluid-applied reinforced unsaturated polyester waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.

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 two (2) inch (5 cm) overlap between vertical and horizontal flashing components.

Walls, Curbs and Base Flashings

Wall, curb and base flashings shall be installed to solid substrate surfaces only. Adhering to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding, and other similar materials is not acceptable.

Flash all walls, curbs and base flashings using cold fluid-applied reinforced unsaturated polyester waterproofing membrane. Flashing material shall be the same resin used in the field membrane with 165 fleece reinforcement.

As specified, reinforce all transition locations and other potential wear areas with a four (4) inch wide 165 or 200 polyester fleece bottom layer evenly positioned over the transition prior to installing the exposed flashing layer.

Reinforce all inside and outside corners with a four (4) inch diameter conical piece of 165 fleece prior to installing the exposed flashing layer.

All pins, dowels and other fixation elements shall be flashed separately with a vertical flashing component prior to installing the exposed flashing layer.

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Extend flashing a minimum of four (4) inches onto the field substrate surface.

Drip Edges and Gravel Stops

Metal drip edges and gravel stops shall be installed to solid substrate surfaces only. Securement to gypsum-based panels, cementitious stucco, synthetic stucco, wood or metal siding or coping, and other similar materials is not acceptable.

Flash all drip edges and gravel stops by extending the field membrane all the way to the edge of the exposed face prior to installing the metal edging. Strip in the metal flange with a separate 8 inch wide strip of membrane adhered to both the securement flange and to the field membrane.

For conditions where water infiltration behind the exposed drip edge or gravel stop face is possible, install a separate 165 or 200 polyester fleece bottom layer positioned behind the face area and extending a minimum of four (4) inches past the securement flange onto the field substrate prior to installing the drip edge or gravel stop.

Field Fabricated Control or Expansion Joint Flashing

Control or expansion joints in excess of two (2) inches in width require the use of a separate engineered joint system.

Control or expansion joints two (2) inches or less in width may be flashed with two layers of cold fluid-applied reinforced unsaturated polyester waterproofing membrane and a compressible foam or rubber insert.

Grind or otherwise bevel the inside edges of the joint opening to provide a smooth transition edge for the fleece.

Flashing typically consists of a 165 or 200 polyester reinforcing fleece bottom layer looped into the joint as a cradle, a compressible foam or rubber insert at 25% compression fitted into the joint, and a 165 polyester fleece top layer applied over the joint. Extend both fleece layers four (4) inches minimum onto the field substrate on both sides of the joint.

Apply the field membrane over the entire joint area.

Electrical Conduit, Gas Lines and Lightning Protection

Supports for electrical conduit and gas lines greater than one (1) inch in diameter require the use of a separate engineered support system.

Supports for electrical conduit and gas lines one (1) inch or less in diameter, and bases for lightning protection rods and cable, can be adhered directly to the membrane surface with a single-component, high quality polyurethane sealant.

KEMPEROL SURFACING & FINISHES – GENERAL

Approved urethane, acrylic, and epoxy coatings and sealers, kiln-dried silica sand, or ceramic granule surfacing may be applied to Kemperol membranes to achieve various performance and/or aesthetic purposes.

Polyester-based membrane resins develop a waxy paraffin film on the membrane surface. DO NOT apply coatings and sealers directly to this sticky surface. Allow the paraffin film to weather away naturally by waiting a minimum of 48 hours before applying coatings and sealers. An MEK solvent wipe may be required to remove any paraffin film residue that remains.

When mixing coatings and sealers prior to application, DO NOT AERATE the material as this will result in bubbles and pinholes in the applied finish.

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AGGREGATE SURFACING

Aggregate Specification and Size

All surfacing aggregates shall be washed, kiln-dried, dust-free, suitable for broadcast, round grain or angular, and sized as follows:

Aesthetic/Fire Rating	0.3 - 1.0 mm
Alkalinity/Adhesion Key:	0.5 - 1.2 mm
Pedestrian Traffic:	0.4 - 1.0 mm
Light Vehicular Traffic:	0.5 - 1.2 mm

KSI recommends blending a minimum of two different colored aggregates to create a uniform surface finish for best aesthetic appearance and effectiveness in hiding of dirt and imperfections.

Mixing of H2O Sealer and H2O Color Coating

Step 1: Premix resin with a clean spiral agitator or stir stick until a uniform consistency is obtained.

NOTE: *Premix only that amount of resin that can be used in 1 hour to prevent development of skin on top of resin.*

Mixing of FR Color Coating

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick. Resin solution should be a uniform color, with no light or dark streaks present.

Step 2: Premix resin Component B thoroughly with a spiral agitator or stir stick. Resin solution should be a uniform color, with no light or dark streaks present.

Step 3: Pour resin Component A and Component B into a third clean bucket at a 1:1 ratio (equal parts) and thoroughly mix the components with a clean spiral agitator. The Resin solution should be a uniform color, with no light or dark streaks present.

NOTE: *Mix only that amount of resin Components A & B that can be used in 30 minutes.*

Mixing of Deko Sealer

Step 1: Premix resin with a clean spiral agitator with a spiral agitator or stir stick.

Step 2: For aggregate bonding, apply resin directly to the membrane surface.

Step 3: For aggregate sealing only, add 1K-Thinner into resin and mix the two liquid components for approximately 2 minutes with a clean spiral agitator on slow speed or stir stick without creating any bubbles or streaks. This will thin the resin and facilitate even sealer application.

NOTE: *that amount of resin that can be used in 1 hour to prevent development of skin on top of resin.*

Aggregate Surfacing Application

Broadcast specified and approved sand or aggregate in excess into a bonding coat application of Membrane Manufacturer's approved urethane-based aggregate coating system applied over clean, cured membrane at the rate of approximately 0.8 gal. per 100 square feet. Aggregate shall be applied at the rate of 60 lbs. per 100 square feet. Obtain uniform and full coverage.

Following minimum 24 hour cure time remove loose/un-embedded mineral aggregate by blowing with oil-free compressed air or with a vacuum. Re-broadcast clean mineral aggregate as required to provide full embedment and coverage of membrane.

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Seal aggregate surface with a sealing coat application of Membrane Manufacturer's approved aggregate coating, applied at the rate of approximately 0.8 gal. per 100 square feet. After completion of mineral aggregate broadcasting, avoid any traffic for a minimum of three (3) days to allow for surfacing to cure.

Sealer System Against Fresh Concrete & Alkalinity

Where placement of concrete or other cementitious material is required over sections of the roofing/waterproofing membrane and flashings, apply one (1) heavy or two (2) lighter coats of EP or EP5 primer at 1.5 gal (5.7L)/100 SF (9 m²) total application, with broadcast of kiln-dried silica sand at the rate of 30 lbs. per 100 SF into final wet coat of primer. This provides a protective surfacing to resist deterioration of membrane from the alkalinity of fresh concrete and other cementitious materials.

Note: Provide temporary surface protection and continuous cleaning with water and brush (high-pressure water if necessary) to eliminate settlement of concrete residues on in-place roofing/waterproofing membrane adjacent to area of concrete placement.

Adhesion Key Surfacing Application

Where placement of asphalt pavement or other adhered-type overburden is required over sections of the roofing/waterproofing membrane and flashings, apply one (1) coat of EP or EP5 primer at 1.0 gal (3.8L)/100 SF (9 m²) per coat, with broadcast of kiln-dried silica sand at the rate of 30 lbs. per 100 SF into wet primer. This provides a membrane surface profile for enhanced bonding capability.

SMOOTH COATING FINISH SURFACING

Mixing of H2O Color Coating and BSF-R Primer/Sealer

Step 1: Premix resin with a clean spiral agitator or stir stick until a uniform consistency is obtained.

NOTE: *Premix only that amount of resin that can be used in 1 hour to prevent development of skin on top of resin.*

Mixing of FR Color Coating

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick. Resin solution should be a uniform color, with no light or dark streaks present..

Step 2: Premix resin Component B thoroughly with a spiral agitator or stir stick. Resin solution should be a uniform color, with no light or dark streaks present.

Step 3: Pour resin Component A and Component B into a third clean bucket at a 1:1 ratio (equal parts) and thoroughly mix the components with a clean spiral agitator. The Resin solution should be a uniform color, with no light or dark streaks present.

NOTE: *Mix only that amount of resin Components A & B that can be used in 1 hour. Remix every 30 minutes.*

Mixing of Standard Color Coating

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick.

Step 2: Pour resin Component B into 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. The Resin solution should be a uniform color, with no light or dark streaks present.

NOTE: *Mix only that amount of resin Components A & B that can be used in 1 hour. Remix every 30 minutes. DO NOT break down workpacks into smaller quantities - mix the entire workpack.*

Mixing of EP-FR Sealer

Step 1: Premix resin Component A thoroughly with a spiral agitator or stir stick.

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Step 2: Pour resin Component B into 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. The Resin solution should be a uniform color, with no light or dark streaks present.

NOTE: Mix only that amount of resin Components A & B that can be used in 15-20 minutes. DO NOT break down workpacs into smaller quantities - mix the entire workpack.

Smooth Coating Application

Roller-apply Membrane Manufacturer's approved acrylic, urethane, or epoxy-based coating over clean, cured membrane at the rate of approximately 0.8 gal. per 100 square feet. Obtain uniform and full coverage, eliminating roller marks, but do not overwork.

Following minimum 12 hour cure time, apply an additional coat of Membrane Manufacturer's approved acrylic, urethane, or epoxy-based coating at the rate of approximately 0.8 gal. per 100 square feet per coat. The application of two coats of all smooth coatings is recommended to achieve best appearance and longest performance life.

After completion of coating, avoid any traffic for a minimum of two (2) days.

MINERAL-FILLED AGGREGATE TRAFFIC SURFACING

Mixing of TC Surfacing

Step 1: Pre-mix TC Surfacing Component A (white formulation) with a spiral Kemperol agitator for 1 minute, until the liquid is a uniform beige color and all solids that may have settled to the bottom of the can have been mixed.

Step 2: Mix Component A (light brown formulation) and Component B (white formulation) in a separate clean mixing bucket with a spiral Kemperol agitator for 30 seconds, until the liquid is a uniform beige color without light or dark streaks.

Step 3: Gradually add Component C (white graded fillers) to the liquid while mixing continues for an additional 1 minute until a smooth, lump free mix is produced.

NOTE: Mix only that amount of surfacing that can be used in 10 minutes. Do not exceed mixing times.

Application of TC Surfacing and Aggregate

Empty mixing bucket of all TC mix onto the prepared surface and spread with a 1/4" x 1/4" x 1/4" notched steel trowel at the specified coverage rate, approximately 23 kilograms per 100 square feet (9 m²).

Allow the TC mix to self-level and reach an initial set for 10-20 minutes until material will retain a peak after being touched by a finger.

Broadcast Membrane Manufacturer's approved aggregate to excess into TC until a uniform dry aggregate layer has been achieved, at the rate of approximately 100 lbs. per 100 square feet. Aggregate will initially sink into TC, requiring the application of additional aggregate until wet spots no longer occur and only dry aggregate is visible.

Allow the aggregate-filled TC to cure for approximately 2 hours, then remove excess aggregate by brooming and vacuuming.

Application of Sealer

Roller-apply Membrane Manufacturer's approved urethane or epoxy-based sealer at the rate of approximately 0.8 gal. per 100 square feet per coat to provide a sealed, maintainable surface finish. For colored aggregate for pedestrian usage, apply transparent urethane H2O Sealer or 1K-Deko. For natural kiln-dried sand for vehicular traffic, apply colored epoxy EP-FR Sealer.

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After completion of mineral aggregate surfacing and sealing, avoid any traffic for a minimum of three (3) days.

MINERAL-FILLED INDUSTRIAL FLOOR SURFACING

Mixing of FC Surfacing

Step 1: Pre-mix FC Surfacing Component A (white formulation) with a spiral Kemperol agitator for 1 minute, until the liquid is a uniform beige color and all solids that may have settled to the bottom of the can have been mixed.

Step 2: Add Component B (dark brown formulation) into Component A and mix together with a spiral Kemperol agitator for 1 minute, until the liquid is a uniform beige color without light or dark streaks.

Step 3: Transfer mixed Components A and B into separate clean mixing bucket. Gradually add prepackaged Component C (white graded fillers) to the liquid while mixing continues for an additional 1 minute until a smooth, lump free mix is produced.

NOTE: Mix only that amount of surfacing that can be used in 15 minutes. Do not exceed mixing times.

Application of FC Surfacing

Empty mixing bucket of all FC Surfacing mix onto the prepared surface and spread with a 1/4" x 1/4" x 1/4" notched steel trowel at the specified coverage rate, approximately 25 kilograms per 100 square feet (9 m²), to achieve a 2-3 mm wet film thickness.

Allow the FC to self-level and begin to cure. Following an initial curing time of 15 minutes, de-aerate the surfacing a minimum of two times in perpendicular directions with a porcupine roller in order to pop the air bubbles that develop within the surfacing.

Wear nail shoes to facilitate the de-aerating operation.

Allow overnight curing before light pedestrian traffic, two days curing before unrestricted pedestrian traffic, and seven days curing before unrestricted vehicular traffic.

Application of Optional Slip-Resistant Finish

Apply supplemental adhesion layer of FC (without Component C) at the rate of approximately 3 kilograms per 100 square feet (9 m²).

Broadcast .50 - 1.2 mm kiln-dried sand at the rate of 20 lbs. per 100 square feet (9 m²) into wet coating.

Following an overnight cure, apply sealing layer of FC (without Component C) at the rate of approximately 3 kilograms per 100 square feet (9 m²).

Application of Optional Flake Finish

Immediately following the de-aerating operation, broadcast Color Flakes into the wet FC Surfacing at an application rate to achieve the desired aesthetic appearance.

Wear nail shoes to facilitate the color flake application.

Following an overnight cure, apply sealing layer of H2O Sealer with a roller at the rate of approximately 0.8 gal. per 100 square feet per coat.

PROTECTION

Protect finished application from all other contractors and activities during and after completion. Any damage to the system must be repaired as recommended by KSI Kemper System, Inc.

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CLEAN-UP & DISPOSAL

Remove all masking, protection, equipment, materials, and debris from the work and storage areas and leave those areas in an undamaged and acceptable condition.

Cured Kemperol primers and resin may be disposed of in standard landfills. This is accomplished by thoroughly mixing all components. Note: Uncured Kemperol primers and resin are considered hazardous materials and must be handled as such, in accordance with local, state and federal regulations. Do not throw uncured resin and primer away.

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