

SECTION 07 14 16

COLD LIQUID-APPLIED FULLY REINFORCED WATERPROOFING WITH DIRECT BONDED OVERBURDEN

(Specification for fully-reinforced, IMPERMITEK IR-26 waterproofing membrane & flashings for direct bonded concrete, asphalt, pavers, or tile overburden)

NOTE: This guide specification is provided as a guideline and must be modified, as required, by the Designer of Record for each project. This specification is prepared in general accordance with CSI format to be included under Division 7 – Thermal and Moisture Protection. Additional information is provided. [delete this paragraph]

Optional information is presented in “blue” font below. Choose appropriate options, delete as necessary. [delete this paragraph]

1. GENERAL

1.1. SUMMARY

- A. The new roofing and waterproofing system shall consist of a cold liquid applied reinforced waterproofing membrane, flashings and finish layers as specified.
- B. Work shall include, but is not limited to, the following:
 - 1. Preparation of **existing (new)** structural concrete deck, and all flashing substrates.
 - 2. Liquid applied, reinforced flashings.
 - 3. Liquid applied, reinforced waterproofing membrane.
 - 4. Liquid applied, resin-aggregate alkalinity protection and bonding layer.
 - 5. Concrete, asphalt, or tile overburden by others.
 - 6. All related materials and labor required to complete specified waterproofing necessary to receive specified manufacturer’s warranty.

1.2. RELATED SECTIONS

- A. Division 010000 - General Requirements
- B. Division 011000 - Summary of Work
- C. Division 076200 - Sheet Metal Flashing and Trim

1.3. DEFINITIONS

- A. ASTM D 1079- Standard Terminology Relating to Roofing and Waterproofing.
- B. The National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual, Fifth Edition Glossary.

1.4. REFERENCES

- A. AMERICAN CONCRETE INSTITUTE (ACI).
 - 1. *ACI 301 – Specifications for Structural Concrete.*
 - 2. *ACI 308-Specification for Curing Concrete.*
- B. AMERICAN STANDARD OF TESTING METHODS (ASTM):
 - 1. *ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.*
 - 2. *ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.*
 - 3. *ASTM D 4258 – Standard Practice for Surface Cleaning Concrete for Coatings.*
 - 4. *ASTM D 4259 – Standard Practice for Abrading Concrete.*
 - 5. *ASTM D 4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.*
 - 6. *ASTM E 96 – Test Methods of Water Vapor Transmission of Materials.*
 - 7. *ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.*
 - 8. *ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.*
 - 9. *ASTM F 2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Using in situ Probes.*
- C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
- D. FACTORY MUTUAL (FM):
- E. FLORIDA BUILDING CODE (FBC):
 - 1. *20XX Florida Building Code (FBC).*
- F. INTERNATIONAL CODES COUNCIL (ICC):
 - 1. *20XX International Building Code (IBC).*
- G. INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI).
- H. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).
- I. UNDERWRITERS LABORATORIES (UL):
 - 1. *UL 790 Standard Test Methods for Fire Tests of Roof Coverings.*
 - 2. *UL 1256 – Fire Test of Roof Deck Constructions.*
- J. THE SOCIETY FOR PROTECTIVE COATINGS (SSPC).

1.5. **ACTION SUBMITTALS**

- A. Product Data Sheets: Submit manufacturer's product data sheets, installation instructions and/or general requirements for each component.

- B. Safety Data Sheets: Submit manufacturer's Safety Data Sheets (SDS) for each component.
- C. Sample warranty from the manufacturer and contractor.
- D. Provide roof plan and representative detail drawings.

1.6. **INFORMATIONAL SUBMITTALS**

- A. Submit a letter from the roofing manufacturer indicating the contractor is an authorized applicator.

1.7. **CLOSEOUT SUBMITTALS**

- A. Warranty: Provide manufacturer's and contractor's warranties upon project completion.

1.8. **QUALITY ASSURANCE**

A. MANUFACTURER QUALIFICATIONS:

- 1. Manufacturer shall have 20 years of manufacturing experience.
- 2. Manufacturer shall have trained technical service representatives employed by the manufacturer, independent of sales.
- 3. Manufacturer shall provide site visit reports in a timely manner.

B. CONTRACTOR QUALIFICATIONS:

- 1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.
- 2. Applicators shall have completed projects of similar scope using same or similar materials specified.
- 3. Contractor shall provide full time, on-site superintendent or foreman experienced with the specified roofing from beginning through satisfactory project completion.
- 4. Applicators shall be skilled in the application methods for all materials.
- 5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.
- 6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.

C. SUBSTRATE EVALUATION:

- 1. Contractor shall evaluate substrate moisture content and adhesion of waterproofing materials to substrate throughout the work and record with daily inspection reports or other form of reporting acceptable to the owner or his designated representative and waterproofing manufacturer.
 - a. Moisture content: Evaluate substrate moisture content to determine acceptability for application of the specified liquid applied waterproofing materials. Moisture testing shall be performed by means suitable to the project application, or by testing substrate relative humidity (RH) in accordance with ASTM

F 2170 when needed, required, or if substrate moisture content is in question.

- b. Adhesion: Evaluate soundness and surface preparation of concrete and/or masonry substrates. Prepare representative areas using specified methods complete with applied primer and waterproofing membrane. Test for minimum acceptable tensile bond strength values as required in accordance with ASTM D 4541. Evaluate all areas where concrete appears to differ in appearance or consistency, if multiple areas are involved in the scope of work, evaluate each area with a minimum of (3) tests for every 5,000 ft² or as required by project conditions.

1.9. DELIVERY, STORAGE AND HANDLING

- A. Refer to each product data sheet or other published literature for specific requirements.
- B. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.
- C. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.
- D. When materials are to be stored outdoors, store away from standing water, stacked on raised pallets or dunnage, at least 4 in (100 mm) or more above ground level. Carefully cover storage with "breathable" tarpaulins to protect materials from precipitation and to prevent exposure to condensation.
- E. Carefully store roof membrane materials delivered in rolls on-end with selvage edges up. Store and protect roll storage to prevent damage.
- F. Properly dispose of all product wrappers, pallets, cardboard tubes, scrap, waste, and debris. All damaged materials shall be removed from job site and replaced with new, suitable materials.

1.10. SITE CONDITIONS

- A. SAFETY:
 - 1. The contractor shall be responsible for complying with all project-related safety and environmental requirements.
 - 2. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified liquid applied or semi-solid roofing materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.

3. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified hot asphalt-applied materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.
4. The contractor shall refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

B. **ENVIRONMENTAL CONDITIONS:**

1. Monitor substrate and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.
2. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry, during the application of roofing materials. Ensure all roofing materials and substrates remain above the dew point temperature as required to prevent condensation and maintain dry conditions.
3. Contractor shall implement odor control measures where required during the application of waterproofing materials and adjust methods as necessary to accommodate varying project conditions.

1.11. **WARRANTY**

- A. Manufacturer's Standard **No Dollar Limit (NDL)** Waterproofing Warranty: The manufacturer shall provide the owner with the manufacturer's warranty providing labor and materials for **10 15 20** years from the date the warranty is issued.
- B. The contractor shall guarantee workmanship and shall provide the owner with the contractor's warranty covering workmanship for a period of 2 years from completion date.

2. **PRODUCTS**

2.1. **MANUFACTURER**

- A. **SINGLE SOURCE MANUFACTURER:** All liquid applied membrane and accessories shall be manufactured by a single supplier with 20 years or more manufacturing history.

1. Comply with the manufacturer's requirements as necessary to provide the specified warranty.
- B. **PRODUCT QUALITY ASSURANCE PROGRAM:** Manufacturer shall be an ISO 9001 registered company. A 'Quality Compliance Certificate (QCC) for reporting/confirming the tested values of the membrane materials will be supplied upon request.
- C. **ACCEPTABLE MANUFACTURER:**
 - Registered company name: Impermitek
 - Address: 5031 53 Ave, Mundare, AB, T0B 3H0, Canada
 - Telephone: +1 780 289 4542 or +1 780 906 4600
 - Fax: Not Available
 - Website: www.impermitek.com
 - Email: technical@impermitek.com

2.2. **LIQUID APPLIED WATERPROOFING & SURFACING SYSTEM**

- A. **COLD LIQUID APPLIED FIELD & FLASHING MEMBRANE WATERPROOFING:**
 1. **IMPERMITEK IR-26 RESIN:**
 - a. Rapid curing, flexible hybrid polyester liquid resin with an embedded fiberglass reinforcement fabric used for monolithic waterproofing field membranes.
 - i. Color: [White](#), [Light Grey](#)

SELF-LEVELING MORTAR ALKALINITY BARRIER & BONDING LAYER

POLYMETHYL METHACRYLATE MORTAR (PMMA):

IMPERMITEK SELF-LEVELING MORTAR: Rapid curing, polymethyl methacrylate (PMMA) liquid resin-mortar consisting of a filler powder and liquid resin used as a heavy-duty wearing layer in IMPERMITEK pedestrian and vehicular traffic systems..

IMPERMITEK SL MORTAR Part A: Rapid curing, polymethyl methacrylate (PMMA) liquid resin.

VOC content: <5 g/L

Color: Pebble Grey

IMPERMITEK SL MORTAR Part B: Filler powder.

PMMA FINISH RESIN ALKALINITY BARRIER & BONDING LAYER

POLYMETHYL METHACRYLATE FINISH (PMMA):

IMPERMITEK POLYFINISH: Rapid curing, polymethyl methacrylate (PMMA) liquid resin.

VOC content: <5 g/L

Color: Pebble Grey

PMMA MEMBRANE RESIN ALKALINITY BARRIER & BONDING LAYER

POLYMETHYL METHACRYLATE MEMBRANE RESIN (PMMA):

IMPERMITEK MMA FLASH: Rapid curing, polymethyl methacrylate (PMMA) liquid resin with an embedded polyester reinforcement fabric used for monolithic waterproofing flashing membranes.

VOC content: 2.4 g/L

- ii. Color: Pebble Grey
- iii. Elongation at 73.4°F (23°C): 55%
- iv. Peak load at 73.4°F lbf/in: 70
- v. Tear resistance lbf: 70
- vi. Shore A hardness, durometer: 70
- vii. Water absorption at 212°F (100°C): 0.8%
- viii. Water vapor permeance (perms): 0.2
- ix. Low temperature flexibility °F (°C): -33 (-36.1)
- x. Dimensional stability: 0.1%

2.3. ACCESSORIES

A. PRIMERS:

1. AC TECH 2170 FC Primer: *Low odor, two-part, moisture mitigation epoxy-based primer for concrete and approved substrates.*
 - a. AC TECH 2170 FC PART A:
 - i. VOC content: 0 g/L
 - ii. Color: Clear
 - b. AC TECH 2170 FC PART B:
 - i. VOC content: 0 g/L
 - c. Color: Yellowish
2. IMPERMITEK GENERAL PRIMER: Rapid curing, polymethyl methacrylate (PMMA) liquid resin used to promote adhesion of IMPERMITEK membranes over asphaltic substrates, wood, concrete, and approved coverboard substrates.
 - a. Color: White
3. IMPERMITEK METAL DETAILING PRIMER: One component primer used to improve the adhesion of IMPERMITEK membranes to metal substrates.
 - a. Color: Black

B. CATALYST:

1. IMPERMITEK CATALYST POWDER: Reactive agent used to cure IMPERMITEK IR-26 and IMPERMITEK PMMA liquid resins.

C. REINFORCING FABRIC:

1. IMPERMITEK TEKMAT FIELD 225 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IMPERMITEK IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 225 g/m²
 - b. Width: 38 in (96.5 cm)
 - c. Length: 172.6 ft (52.6 m)
2. IMPERMITEK TEKMAT FIELD 450 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IMPERMITEK IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 450 g/m²
 - b. Width: 38 in (96.5 cm)
 - c. Length: 103.6 ft (31 m)
3. IMPERMITEK TEKMAT FLASHING 450 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IMPERMITEK IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 450 g/m²
 - b. Width: 12 in (300 mm)
 - c. Length: 59 ft (18 m)
4. IMPERMITEK TEKMAT BANDAGE 450 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IMPERMITEK IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 450 g/m²
 - b. Width: 3 in (75 mm)
 - c. Length: 89 ft (8.25 m)
5. IMPERMITEK TEKMAT SMOOT MAT REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IMPERMITEK IR-26 liquid applied flashing applications.
 - a. Weights: 100 g/m²
 - b. Width: 6 in (150 mm)
6. Length: 328 ft (100 m)

D. **CLEANER:**

1. IMPERMITEK CLEANER & ACTIVATOR: Clear, blended solvent used to clean and prepare plastic and metal surfaces and used to clean existing IMPERMITEK IR-26 membrane surfaces prior to the application of IMPERMITEK IR-26 liquid applied membrane, flashings, and optional IMPERMITEK surfacing.
 - a. Color: Clear

E. **PASTE AND SUBSTRATE REPAIR MORTAR:**

1. IMPERMITEK POLYPASTE: Rapid curing, polymethyl methacrylate (PMMA) paste resin used to fill small cracks and voids on non-traffic bearing substrates prior to the application of waterproofing membranes.

- a. VOC content: 4.4 g/L
- b. Color: Grey

2. IMPERMITEK SELF-LEVELING MORTAR: Rapid curing, polymethyl methacrylate (PMMA) liquid resin-mortar used as for substrate patching and repairs.

- a. IMPERMITEK SL MORTAR Part A: Rapid curing, polymethyl methacrylate (PMMA) liquid resin.
 - i. VOC content: <5 g/L
 - ii. Color: Pebble Grey
- b. IMPERMITEK SL MORTAR Part B: Filler powder.

F. **SURFACING AGGREGATE:**

- 1. IMPERMITEK SURFACING AGGREGATE: Quartz aggregate used in to create slip-resistant and textured finishes.
 - a. Grade 1: 0.7-1.2 mm (25-A: 25 mesh angular)
 - b. Color: specify - Natural.

2.4. **MISCELLANEOUS ACCESSORIES**

A. **SHEET METAL FLASHING:**

- 1. Contractor shall furnish all sheet metal flashings, counter flashings, roof edge system, and all other related sheet metal flashings and associated fasteners necessary to flash and counter flash the specified waterproofing system.
- 2. Sheet metal flashing materials and fasteners shall be compatible with adjacent materials, to accommodate all project related exposures.
- 3. Pre-Finished (Mill Finished) Sheet Metal Flashing Material: Aluminum, Galvanized Steel, Stainless Steel, Copper.
- 4. Metal Edge System: Tested per ANSI/SPRI ES-1 to meet or exceed design pressures at roof edge.

3. **EXECUTION**

3.1. **EXAMINATION**

- A. Examination includes visual observations, qualitative analysis, and quantitative testing measures as necessary to ensure conditions are satisfactory to begin and remain satisfactory throughout the project.
- B. The contractor shall examine all waterproofing substrates including, but not limited to decks, walls, curbs, equipment, fixtures, and wood blocking.
- C. The applicator shall not begin installation until conditions have been properly examined and determined to be clean, dry and, otherwise satisfactory to receive specified roofing and waterproofing materials.

3.2. **PREPARATION**

A. **GENERAL**

1. Before commencing work each day, the contractor shall prepare all waterproofing substrates to ensure conditions are satisfactory to proceed with the installation of specified waterproofing materials. Preparation of substrates includes, but is not limited to, substrate repairs, securement of substrates, eliminating all incompatible materials, and cleaning.
2. Where conditions are found to be unsatisfactory, work shall not begin until conditions are made satisfactory to begin work. Commencing of work shall indicate contractor's acceptance of conditions.
3. On re-waterproofing applications, the existing waterproofing membrane and flashings shall be completely removed to the deck. Prepare deck and flashings substrates as required for application of new waterproofing system.
4. All substrates must be clean, dry, and 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 primer and/or resin materials to the substrate. Most flashing surfaces will require mechanical abrasion in the form of scarifying, shot blasting or grinding to achieve a suitable substrate.

3.3. **LIQUID APPLIED MEMBRANE & FLASHING SUBSTRATE PREPARATION**

- A. Before commencing work each day the contractor shall prepare all substrates to ensure conditions are satisfactory to proceed with the installation of specified materials.
- B. Preparation of substrates includes, but is not limited to, the following:
 1. General:
 - a. All substrates must be clean, dry, and 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 primer and/or resin materials to the substrate. Most surfaces will require mechanical abrasion in the form of scarifying, shot blasting or grinding to achieve a suitable substrate.
 - b. Inspect all substrates and correct defects before application of waterproofing materials. Fill all surface voids 1/16 in (1.5 mm) or greater wide and/or deep with appropriate fill material.
 2. Concrete Substrates:
 - a. Concrete shall comply with requirements of ACI 301 and ACI 308.
 - b. Concrete compressive strength: 3,500 psi for all primers or 2,500 psi minimum when use of a moisture mitigation primer is required.
 - c. Relative humidity: Maximum 75 percent per ASTM F2170 unless otherwise approved.
 - d. Surface: Scarify, shot blast or grind to ICRI Concrete Surface Profile CSP 3 to CSP 5; CSP 3 being the preferred profile.

- e. Adhesion: Adhesion of specified primer and liquid applied membrane shall be minimum 220 psi for traffic bearing waterproofing applications or 116 psi for roofing or non-traffic bearing waterproofing applications per ASTM D4541.
- f. Areas of spalls, voids, bug holes and other deterioration on vertical or horizontal surfaces shall be repaired as required or recommended.

3. Masonry Substrates:

- a. Walls shall be structurally sound built of hard kiln dried brick, reinforced concrete block, or waterproof concrete block construction.
- b. Liquid applied membrane must not be applied over soft or scaling brick or block, faulty mortar joints, or walls with broken, damaged, or leaking coping. Areas of spalls, voids, bug holes and other deterioration on vertical surfaces shall be repaired as required or recommended.
- c. Walls of ordinary hollow tile, or other materials which in themselves are not waterproofed, should not be accepted as suitable to receive liquid applied membrane unless properly waterproofed to prevent moisture infiltration from above or behind the new liquid applied membrane.
- d. Relative humidity: Maximum 75 percent per ASTM F2170 unless otherwise approved.
- e. Surface: Scarify, shot blast or grind to ICRI Concrete Surface Profile CSP 2 to CSP 4.
- f. Adhesion: Adhesion of specified primer and liquid applied membrane shall be minimum 220 psi for traffic bearing waterproofing applications or 116 psi for roofing or non-traffic bearing waterproofing applications per ASTM D4541.

4. Metal Substrates:

- a. Clean and prepare metal to near-white metal in accordance with SSPC – SP3 (power tool clean) to a point maximum 1/8 in (3 mm) beyond the termination of liquid applied membrane materials and wipe with solvent cleaner to remove oils, debris, or contaminants.
- b. Stainless Steel Series 300 and 400: Abrade to provide rough, open surface and wipe with solvent cleaner to remove oils, debris, or contaminants.
- c. Galvanized & Zinc-Rich Metals: Galvanized and/or zinc rich metals are coated with either a layer of oil to prevent white rust or is passivated which must be completely removed prior to applying primer or liquid applied waterproofing. This can be confirmed by applying a coat of copper sulfate solution to the prepared and cleaned galvanized/zinc metal. A properly prepared surface will turn black indicating the passivator has been removed. If the

surface does not turn black, additional abrasive cleaning will be required.

- d. Adhesion: Examine metal substrates by conducting adhesion testing. Prime with specified metal primer where required to achieve adequate adhesion.

5. Rigid Plastics (PVC & ABS):

- a. Rigid plastics should be lightly abraded and wiped with solvent cleaner. Extend preparation maximum 1/8 in (3 mm) beyond the specified termination of the liquid applied membrane flashing materials.

6. Wood Substrates:

- a. Provide sanded 3/4 in (19 mm) minimum thickness APA A-C, Group 1, Exterior or Exposure 1, 48 in (1220 mm) x 96 in (2440 mm) tongue & groove sheathing panels. Install all panels with "A" side up, edges supported by blocking or structural framing, fastened using only non-corrosive screw fasteners with heads installed flush with sheathing applied at 6 in (150 mm) minimum o.c. along panel edges and 12 in (300 mm) o.c. over intermediate supports and/or additional fastening as required by jurisdictional codes. All new plywood substrates shall be structural panels performance-rated pursuant to National Institute of Standards and Technology (NIST) voluntary product standard PS-1-95; identified with American Plywood Association (APA) grade designations.
- b. Hygroscopic building materials such as wood plank, timber or plywood will normally have higher moisture content (in the range of 8% to 12%) as they adsorb or desorb moisture to reach equilibrium moisture content with the surrounding air. Cold liquid applied primer and reinforced membrane should not be applied to damp or wet sheathing materials but may be applied to materials with higher moisture contents as indicated above, provided the exposed surface is clean and dry. Ultimately, determinations of moisture content and the resulting bond strength should be performed periodically to determine acceptability. If poor adhesion or blistering occurs, substrate will require additional drying time before proceeding.
- c. After priming plywood panels, fill joint gaps, holes, and cracks with proprietary PMMA paste or PMMA mortar. All joints must be covered with minimum 1/2 in (13 mm) wide bond breaker tape followed with minimum 4 in (100 mm) wide strips of cold liquid applied reinforced waterproofing membrane centered over joint. Cover knot holes or cracks with strips of cold liquid applied reinforced waterproofing membrane.

7. Other Flashing Surfaces:

- a. Remove all contaminants and prepare substrate as needed to receive liquid applied waterproofing.
 - b. Adhesion: Examine substrates by conducting adhesion testing. Prime with specified primer where required to achieve adequate adhesion.
- C. Where conditions are found to be unsatisfactory, work shall not begin until conditions are adjusted appropriately. Commencing of work shall indicate contractor's acceptance of conditions.

3.4. **PRIMER APPLICATION (GENERAL)**

- A. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
- B. Examine all substrates and conduct adhesion peel tests as necessary to ensure satisfactory adhesion is achieved.

3.5. **EPOXY PRIMER APPLICATION (AC TECH 2170 FC)**

A. **Moisture Mitigation Primer Applications:**

1. *Mix A and B parts using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.*
2. *Apply primer to compatible, clean, and prepared substrate preferably with falling temperatures to reduce potential for pinholes from "off-gassing" and as required to enhance adhesion of new specified waterproofing materials.*
3. *Apply primer using a notched squeegee and roller or brush at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.*
4. *Allow primer to fully cure and inspect for bubbles, blisters, voids, or pinholes.*
5. *Repair bubbles, blisters, voids, and pinholes as recommended by manufacturer.*
6. *For steep slope, vertical and flashing applications, minimum two coats of primer are required.*
7. *When required as a mechanical key, bonding layer, or where the primer will be left exposed beyond recommended recoat times, following any required primer repairs, apply a second coat of primer over the in-place primer and broadcast to excess with #1 (0.7 – 1.2mm) kiln-dried quartz into the final coat of epoxy primer while still wet at the rate of 30 lb/100 ft² (1.5 kg/m²) as a mechanical bonding layer. After cure, remove loose aggregate and keep dry until subsequent system components are applied.*
8. *Project conditions vary throughout the day. Monitor changing conditions and the curing time of primers.*
9. *Allow primer to fully cure before membrane application.*

3.6. **PMMA PRIMER APPLICATION (IMPERMITEK GENERAL PRIMER)**

- A. Mix primer resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
- B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified waterproofing materials.
- C. Apply primer using brush or roller at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.
- D. Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.
- E. Allow primer to fully cure before membrane application.

3.7. **METAL PRIMER APPLICATION (IMPERMITEK METAL DETAILING PRIMER)**

- A. Mix primer resin approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of primer that can be used within the application time.
- B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified waterproofing materials.
- C. Apply primer using brush or roller at the rate published on the product data sheet. Do not allow primer to pond or collect in low areas.
- D. Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.
- E. Allow primer to fully cure before membrane application.

3.8. **SUBSTRATE PATCHING, LEVELING & REPAIR (IMPERMITEK POLYPASTE OR IMPERMITEK SELF-LEVELING MORTAR)**

- A. GENERAL:
 - 1. After priming and before commencing with application of liquid applied waterproofing, the contractor shall patch, level, or repair all substrates as required to eliminate bug holes, voids, cavities, low spots, repair cracks or any other condition that may be detrimental to proper application of the liquid applied waterproofing.
- B. PATCHING, LEVELING & REPAIRS:
 - 1. Contractor shall use proprietary paste or resin-mortar for all patching, leveling or repairs wherever possible. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
 - 2. Traffic bearing substrates: Use only resin-mortar for all substrate leveling, patching and repairs.
 - 3. Non-traffic bearing horizontal or vertical substrates: Use paste or resin-mortar for all substrate leveling, patching and repairs.
 - 4. Application:
 - a. Install paste or resin-mortar over a fully cured primer.
 - b. The substrate shall be dry and free of any dust or loose particles.

- c. Mix paste resin and/or resin-mortar using a slow speed agitator prior to pouring into a larger container.
 - d. When required, combine the paste or resin-mortar with #1 (0.7 – 1.2mm) kiln-dried quartz aggregate as recommended for deep voids or large areas.
 - e. Mix paste and/or resin-mortar and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of product that can be used within the application time.
 - f. Apply the catalyzed paste and/or resin-mortar onto the substrate using a smoothing trowel, working the material into the surface for complete coverage and full adhesion.
 - g. Paste and/or resin-mortar should be placed in lifts no greater than the maximum thicknesses recommended.
 - h. If additional lifts will be required, broadcast top surface of the placed paste or resin-mortar with clean dry #1 (0.7 - 1.2 mm) kiln-dried quartz aggregate at approximately 25% coverage while the paste and/or resin-mortar is wet. Place next lift once the paste and/or resin-mortar has cured.
- C. NON-MOVING (STATIC) CRACKS – 1 mm or less:
- 1. Determine that crack is non-moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin mortar or paste as required.
- D. MOVING (DYNAMIC) CRACKS – 1 mm or less:
- 1. Determine that crack is moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin-mortar or paste as required. After the resin-mortar or paste has cured, apply minimum 4 in (100 mm) wide strip of reinforced cold liquid applied membrane centered over crack.
- E. MOVING (DYNAMIC) CRACKS – 3 mm or less:
- 1. Determine that crack is moving. Remove any existing filler and clean out crack by brushing and oil-free compressed air. Fill crack with resin-mortar or paste as required. After the resin-mortar or paste has cured, apply bond breaker tape 5 times in width greater than the maximum anticipated expansion. Then cover with a strip of reinforced cold liquid applied membrane centered over crack sized to provided 2 in (50 mm) minimum cover beyond all side of the bond breaker tape but no less than 6 in (150 mm) minimum width.
- F. MOVING (DYNAMIC) CRACKS – Greater than 3 mm:
- 1. Moving cracks greater than 3 mm must be treated as an expansion joint.

8. **INSTALLATION & STAGING**

- A. In a normal cold liquid applied membrane application the substrate is prepared and primed, flashings are installed, followed by the application of the waterproofing membrane and finish. When applying broadcast aggregate, the

aggregate should not be left subject to the elements, and therefore must be top coated with finish the same day of application whenever possible.

- B. If work is interrupted for more than 12 hours use manufacturer's proprietary cleaner to clean and reactivate applied primer, resin mortar, flashing membrane or field membrane transition areas. Cleaner should be allowed a minimum of 20 minutes evaporation time after application and covered within 60 minutes of application or as recommended by the manufacturer.

9. **FLASHING MEMBRANE APPLICATION (IMPERMITEK IMPERMITEK IR-26 MEMBRANE)**

A. General:

1. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
2. Provide a minimum vertical height of 8 in (200 mm) for all flashing terminations wherever possible. Flashing height shall be at least as high as the potential water level that could be reached because of a deluging rain and/or poor slope.
3. Do not flash over existing through-wall flashings, weep holes and overflow scuppers.
4. All flashing shall be terminated as required by the manufacturer. Cap flashings or counter flashings may be constructed of metal, stone, tile or other materials properly installed in accordance with industry-accepted practice.
5. Install all flashing membranes before installing field membranes.
6. The primed substrate shall be dry and free of any dust, loose particles, or contaminants.
7. Precut reinforcing mat to conform to terminations, transitions and penetrations being flashed. Ensure a minimum 2 in (50 mm) overlap of fleece at side laps and extend flashing 4 in (100 mm) minimum horizontally onto deck unless otherwise specified. Ensure the completed liquid applied flashing membrane is fully reinforced.
8. Mix waterproofing resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of waterproofing resin that can be used within the application time.
9. Apply the base coat of catalyzed waterproofing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion.
10. Immediately apply the reinforcing mat into the wet base coat of resin. Using a brush or roller, work the reinforcing mat into the wet resin while completely encapsulating the mat. Avoid any folds, dry spots, and wrinkles.
11. Immediately following base coat cure, apply the second coat of catalyzed waterproofing resin for complete encapsulation and coverage of the mat.

12. At membrane tie-ins, clean cured membrane with specified cleaner before application of adjacent membrane where required.

B. Penetrations & Flashings

1. Pipes, Conduits, Posts, Supports and Unusual Shaped Penetrations:
 - a. Pipes, conduits, and other items to be flashed must be separated with $\frac{1}{2}$ in (13 mm) minimum clearance or as recommended by manufacturer to adequately waterproof each individual penetration.
 - b. All penetrations must be flashed individually. Two or more items ganged together in a flashing will NOT be permitted.
 - c. Flash penetrations using cold liquid applied reinforced membrane or proprietary fibrated flashing resin as recommended. Flashing shall be applied using factory pre-cut fleece wherever possible consisting of a reinforced deck skirt/target flashing applied over a reinforced vertical wrap finger flashing.
2. Drains:
 - a. Flash drains using cold liquid applied membrane. Flashing shall consist of a membrane target extending minimum 12 in (300 mm) horizontally onto the substrate applied over a finger flashing extended into the prepared drain bowl a minimum of 3 in (75 mm).
 - b. At no time should the cold liquid applied membrane be installed to restrict or reduce the drain inlet in size.
 - c. For new drains, contractor shall include cost of all plumbing work, piping and connection to existing storm sewer system.
3. Hot Pipes:
 - a. Protect cold liquid applied membrane components from direct contact with steam or heat sources when the in-service temperature exceeds 150°F (65.5°C). In all such cases flash to an intermediate "cool" sleeve.
 - b. Fabricate "cool" sleeve in the form of a metal cone using non-ferrous metal in accordance with manufacturer details.
 - c. Flash sleeve using cold liquid applied reinforced membrane similar to a standard pipe flashing. Flashing shall consist of a reinforced target applied over a reinforced vertical wrap finger flashing.
4. Flexible Penetrations:
 - a. Provide a weather-tight gooseneck set in manufacturer's resin paste and secured to the deck.
 - b. Flash gooseneck penetrations using cold liquid applied reinforced membrane as recommended. Flashing shall consist of a reinforced target and reinforced vertical wrap finger flashing.
5. Walls, Curbs and Bases:

- a. Flash all walls, curbs and bases using cold liquid applied reinforced membrane. Wherever possible extend flashing up and over tops of walls, curbs, and bases so the membrane terminates on the opposite face of the vertical element.
- 6. Expansion Joints:
 - a. Flash all expansion joints with minimum two layers of manufacturer's cold liquid applied reinforced membrane applied over an expansion joint compressible filler, expansion tube, backer rod and/or bond breaker tape as recommended by manufacturer.
- 7. Non-standard Flashing Details:

When required, consult manufacturer for recommendations on flashing non-standard conditions, penetrations, or protrusions.
- 8. Thru-Wall Flashings, Mud-set Masonry, & Poured-In-Place Concrete (Bonding/Protection Layer):
 - a. For all areas to receive new direct applied cement, concrete, or mortar setting bed, apply a supplementary wearing coat of membrane manufacturer's recommended cold liquid applied resin.
 - i. Using a lambswool roller, apply an even layer of cold liquid applied resin at the minimum consumption of 30 lb/100 ft² (1.5 kg/m²) or as recommended by the membrane manufacturer and broadcast #1 (0.7 - 1.2mm) kiln-dried quartz aggregate into the wet resin to excess for full coverage.
 - ii. Allow resin bonding layer to cure as recommended by the membrane manufacturer prior to continuing application or applying loads. Remove excess un-adhered aggregate from surface by broom, vacuum, or oil-free blower prior to apply overburden.
 - iii. When required, consult manufacturer for recommendations on flashing non-standard conditions, penetrations, or protrusions.

10. **FIELD MEMBRANE APPLICATION (IMPERMITEK IR-26 MEMBRANE)**

- A. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
- B. Install all flashing membranes before installing field membranes.
- C. The primed substrate shall be dry and free of any dust, loose particles, or contaminants.
- D. Precut reinforcing mat to conform to terminations, transitions and penetrations being flashed. Ensure a minimum 2 in (50 mm) overlap of fleece at side laps and extend flashing 4 in (100 mm) minimum horizontally onto deck unless otherwise specified. Ensure the completed liquid applied flashing membrane is fully reinforced.

- E. Mix waterproofing resin and catalyst approximately 2 minutes using a clean spiral agitator on slow speed or stir stick until evenly mixed. Do not aerate. Mix only the amount of waterproofing resin that can be used within the application time.
- F. Apply the base coat of catalyzed waterproofing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion.
- G. Immediately apply the reinforcing mat into the wet base coat of resin. Using a brush or roller, work the reinforcing mat into the wet resin while completely encapsulating the mat. Avoid any folds, dry spots, and wrinkles.
- H. Immediately following base coat cure, apply the second coat of catalyzed waterproofing resin for complete encapsulation and coverage of the mat.
- I. At membrane tie-ins, clean cured membrane with specified cleaner before application of adjacent membrane where required.

11. **WATERPROOFING CONTINUITY TESTING & QC EVALUATION**

- A. Prior to applying surfacing or finish, contractor shall conduct a complete evaluation of the installed liquid applied waterproofing membrane and flashings which shall include visual inspection as well as an acceptable method for (low voltage, high voltage, or water-flood) continuity testing when required.
- B. Immediately following evaluation and continuity testing, repair all deficiencies identified in liquid applied waterproofing membrane and flashings.
- C. Upon satisfactory completion of all required repairs, proceed with application of finish layers.

12. **ALKALINITY BARRIER & BONDING LAYER**

- A. For all areas that are going to receive new direct contact cement, poured concrete, paving asphalt or mortar setting bed, apply a supplementary wearing coat of membrane manufacturer's recommended cold liquid applied resin.

1. *Option 1 - PMMA Self-Leveling Mortar Alkalinity & Bonding Layer (IMPERMITEK SELF-LEVELING MORTAR)*
 - a. *Provide waterproofing manufacturer's normal to high volume traffic wearing coat and surfacing option using a combination of resin-mortar and coarse grain aggregate to create an alkalinity barrier and bonding layer.*
 - b. Mix and apply resin-mortar layer in strict accordance with written instructions of manufacturer. Using a flat or V-notch trowel, apply an even layer of resin-mortar at minimum recommended consumption. Work wet resin with a pin rake or spiked roller, removing trapped air, and smoothing the resin-mortar layer.
 - c. During application of resin-mortar leveling and smoothing layer, broadcast #1 (0.7 - 1.2mm) kiln-dried quartz aggregate into the wet resin-mortar to excess for full coverage at an approximate consumption of 140 lb/100 ft² (7.0 kg/m²).
 - d. Allow resin bonding layer to cure as recommended by the membrane manufacturer prior to continuing application or applying loads. Remove excess unadhered aggregate from surface by broom, vacuum, or oil-free blower prior to apply overburden.
2. *Option 2 - PMMA Finish Alkalinity Barrier & Bonding Layer (IMPERMITEK IMPERMIFINISH)*
 - a. Provide waterproofing manufacturer's PMMA color finish applied combination with coarse grain aggregate to create a alkalinity protection and bonding layer.
 - b. Mix and apply an even topcoat of pigmented finish resin using a notched hard rubber squeegee at the minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling.
 - c. Allow resin alkalinity barrier to cure as recommended by the membrane manufacturer prior to continuing application.
 - d. Apply a second even topcoat of pigmented finish resin using a notched hard rubber squeegee at the minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling.
 - e. While the resin is wet, broadcast #1 (0.7 - 1.2mm) kiln-dried quartz aggregate into the wet resin-mortar to excess for full coverage at an approximate consumption of 140 lb/100 ft² (7.0 kg/m²).
 - f. Allow resin bonding layer to cure as recommended by the membrane manufacturer prior to continuing application or applying

loads. Remove excess unadhered aggregate from surface by broom, vacuum, or oil-free blower prior to apply overburden.

3. Option 3 - PMMA Membrane Resin Alkalinity Barrier & Bonding Layer (IMPERMITEK PMMA FLASH)
 - a. Provide waterproofing manufacturer's PMMA membrane resin applied combination with coarse grain aggregate to create an alkalinity protection and bonding layer.
 - b. Apply an even topcoat of PMMA resin using a roller or notched squeegee at the minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling.
 - c. While the resin is wet, broadcast #1 (0.7 - 1.2mm) kiln-dried quartz aggregate into the wet resin-mortar to excess for full coverage at an approximate consumption of 140 lb/100 ft² (7.0 kg/m²).
 - d. Allow resin bonding layer to cure as recommended by the membrane manufacturer prior to continuing application or applying loads. Remove excess unadhered aggregate from surface by broom, vacuum, or oil-free blower prior to apply overburden.

13. **CONCRETE & PAVING ASPHALT OVERBURDEN PLACEMENT (BY OTHERS):**

- A. Overburden shall be placed as soon as possible after installation of the waterproofing system to reduce the risk of damage to the waterproofing membrane.
- B. For concrete overburden, when placing reinforcing steel over waterproofing membrane, use concrete bar supports (dobbies) or chairs with plastic tips or rolled feet to prevent damage from sharp edges. Take special care when using wire mesh, especially if the mesh is curled.
- C. For asphalt overburden, do not use any protection course between the waterproofing membrane and thin-layer asphalt overlays. Following rain, paving must be delayed until the bonding aggregate layer is dry.
- D. Use only pneumatic tire paving equipment for placement of concrete or asphalt onto waterproofing membrane. Equipment should be inspected prior to use for burrs, stones, or sharp projections on tires which could damage the membrane. Note: Flat tracked paving equipment is NOT allowed and should not be used for any applications over new waterproofing membrane.

14. **MUDSET CERAMIC TILE, QUARRY TILE, & PAVER INSTALLATION (BY OTHERS):**

- A. The waterproofing membrane and bonding layer must be allowed to completely cure and be watered tested prior to installation of mortar setting bed and tile overlay system. Tile overlay shall be placed as soon as possible after the installation of the waterproofing system to reduce the risk of damage to the waterproofing membrane.

- B. Tile overlay shall be mud-set with an approved mortar, acceptable to the membrane manufacturer. The mud-set ceramic tile, quarry tile or paver system may be applied over a drainage mat when required. Consult the tile manufacturer regarding requirements for installation and design of setting bed and tile overlay system.
13. **CLEAN UP**
- A. Uncured resin is considered a hazardous material. Unused resin must be catalyzed and cured prior to disposal.
 - B. Clean up and properly dispose of waste and debris resulting from these operations each day as required to prevent damage and disruptions to operations.
14. **PROTECTION**
- A. Upon completion of new work (including all associated work), institute appropriate procedures for surveillance and protection of finished work during remainder of construction period. Protect all areas where waterproofing membrane has been installed.

END OF SECTION