

SECTION 07 52 00

COLD LIQUID APPLIED PROTECTED MEMBRANE ROOF ASSEMBLY WITH BUILT IN-PLACE VEGETATIVE & PAVER OVERBURDEN

(Specification for a fully-reinforced, IMPERMITEK IR-26 roofing membrane for green roof applications.)

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)** roof deck, and all flashing substrates.
 - 2. Optional thermal barrier mechanically fastened.
 - 3. Optional SBS-modified bitumen vapor barrier/temporary waterproofing, self-adhered.
 - 4. Liquid applied, reinforced flashings.
 - 5. Liquid applied, reinforced waterproofing membrane.
 - 6. Drainage mat installed over waterproofing membrane.
 - 7. Extruded polystyrene (XPS) rigid insulation.
 - 8. Filter fabric installed over insulation layer.
 - 9. Hardscape paver and pedestal installation.
 - 10. Vegetative overburden as specified including edge restraints, drain boxes, and all accessories as specified.
 - 11. Optional liquid applied aesthetic smooth, textured, and/or slip resistant pigmented surfacing on exposed roof surfaces.
 - 12. 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 072713 - Modified Bituminous Sheet Vapor Retarders](#)
- D. [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 SOCIETY OF CIVIL ENGINEERS - Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- 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 41 - Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and Waterproofing.
 - 4. ASTM D 312- Standard Specification for Asphalt Used in Roofing.
 - 5. ASTM D 1863 – Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
 - 6. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
 - 7. ASTM D 2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - 8. ASTM D 3019 - Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered.
 - 9. ASTM D 3746 - Standard Test Method for Impact Resistance of Bituminous Roofing System.
 - 10. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
 - 11. ASTM D 4601 - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
 - 12. ASTM D 5147 - Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.
 - 13. ASTM D 5849 - Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement)
 - 14. ASTM D 6162 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.

15. ASTM D 6163 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
 16. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
 17. ASTM D 6298 - Standard Specification for Fiberglass Reinforced Styrene-Butadiene-Styrene (SBS) Modified Bituminous Sheets with a Factory Applied Metal Surface.
 18. ASTM D 7379 - Standard Test Methods for Strength of Modified Bitumen Sheet Material Laps Using Cold Process Adhesive.
 19. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
 20. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
1. ANSI/SPRI/FM 4435/ES-1 Wind Design Standard for Edge System Used with Low Slope Roofing System.
 2. ANSI/SPRI FX-1, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
 3. ANSI/SPRI IA-1, Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
 4. ANSI/FM 4474- American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.
- D. CANADIAN GENERAL STANDARDS BOARD (CGSB):
1. CGSB 37-GP 56M- Standard for: Modified Bituminous, Prefabricated, and Reinforced for Roofing.
- E. COOL ROOF RATING COUNCIL (CRRC)
- F. EPA ENERGY STAR
- G. FACTORY MUTUAL (FM):
1. FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
 2. FM 4470 - Approval Standard - Class I Roof Covers.
- H. [INTERNATIONAL CODES COUNCIL \(ICC\)](#):
1. [2015 International Building Code \(IBC\)](#).
- I. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).
1. UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
 2. UL 1256 – Fire Test of Roof Deck Constructions.

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. **PERFORMANCE REQUIREMENTS**

A. **AIR PERMEANCE:**

1. Vapor Retarder/Air Barrier meets or exceeds ASTM D2178 "Standard Test Method for Air Permeance of Building Materials."

B. **WATER VAPOR TRANSMISSION:**

1. Vapor Retarder/Air Barrier meets or exceeds ASTM E96 (Procedure B) "Standard Test method for Water Vapor Transmission of Materials."

C. **WIND UPLIFT RESISTANCE:**

1. Performance testing shall be in accordance with ANSI/FM 4474, FM 4450, FM 4470, UL 580 or UL 1897.
 - a. Roof System Design Pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system attachment requirements.

- b. Design Pressures:
 - i. Field of Roof (Zone 1): - 0 psf.
 - ii. Perimeter of Roof (Zone 2): - 0 psf.
 - iii. Corners of Roof (Zone 3): - 0 psf.
- c. Approval Rating:
 - i. FM 1-00
 - ii. ANSI/FM 4474 Maximum Design Pressure -000.00

D. **FIRE CLASSIFICATION:**

- 1. Performance testing shall be in accordance with UL 790, ASTM E108, FM 4450 or FM 4470 to meet the 12 roof slope requirement.
 - a. Meets requirements of UL Class A or FM Class A.
- 2. Performance testing shall be in accordance with UL 1256, FM 4450 or FM 4470 to meet the specified requirements for interior flame spread and fuel contribution.
 - a. Meets requirements of UL 1256, or FM Class 1.

E. **ROOF SLOPE:**

- 1. Finished roof slope shall be 1/4 inch per foot (2 percent) minimum for roof drainage.

F. **IMPACT RESISTANCE:**

- 1. Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470, ASTM D3746 or CGSB 37-GP 56M to meet the specified impact resistance requirements.
 - a. Meets requirements for FM-SH (Severe Hail), ASTM D3746, or CGSB 37-GP 56M.

G. **CYCLIC FATIGUE:**

- 1. The roof system shall pass ASTM D5849 Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement). Passing results shall show no signs of cracking, splitting or tearing over the joint.
 - a. Roof system shall pass Test Condition 4, tested at 14°F (-10°C) in accordance with ASTM D5849. **(IMPERMITEK SA STANDARD BASE-PLY glass fiber reinforced membranes).**

H. **ENERGY CONSERVATION REQUIREMENTS:**

- 1. Extruded Polystyrene Insulation "R" Value: Long-term thermal resistance (LTTR) values of the specified foam insulation shall be determined in accordance with CAN/ULC-S770.
- 2. Thermal Resistance 'R' for the specified roof insulation system shall include the continuous insulation (ci) above the roof deck.
 - a. Total Thermal Resistance R Value, continuous insulation (ci) above-deck: R-30.

1.12. **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. Extruded Polystyrene Insulation: The insulation to retain 80% of its original thermal value for the period of **10** years and to be included with waterproofing warranty.
- C. Pavers: The pavers and pedestals shall not crack, split, spall or disintegrate as a result of freeze-thaw cycling for a period of **10** years and to be included with waterproofing warranty.
- D. 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. **ROOFING SYSTEM**

A. **HYBRID SBS-MODIFIED BITUMEN/LIQUID APPLIED MEMBRANE SYSTEM**

1. **THERMAL BARRIER**

a. **GYPSUM ROOF BOARD**

- i. Georgia Pacific Gypsum LLC, **DensDeck Roof Board**, DensDeck Prime Roof Board: Gypsum core, glass fiber-faced, roof board:
 - a) Thickness: 5/8 in (**1/2 in**)
 - b) Dimensions: 4 x 4 ft or 4 x 8 ft boards

- c) Facer: Glass fiber.
 - d) Meets or exceeds ASTM C1177/C1177M.
 - ii. United States Gypsum, Securock Brand Gypsum-Fiber Roof Board: Gypsum core, fiber-reinforced roof board.
 - a) Thickness: 5/8 in (1/2 in)
 - b) Dimensions: 4 x 4 ft or 4 x 8 ft boards
 - c) Facer: None
 - d) Meets or exceeds ASTM C1278.

b. **CEMENT ROOF BOARD**

- i. United States Gypsum, Securock Brand Cement Roof Board:
 - a) Portland cement, lightweight aggregate and glass fiber mesh roof board.
 - b) Thickness: 1/2 in.
 - c) Dimensions: 4 x 4 ft or 4 x 8 ft boards
 - d) Facer: None
 - e) Meets or exceeds ASTM C1325.

2. **THERMAL BARRIER FASTENERS AND PLATES**

- a. #12 DP FASTENER and 3 IN INSULATION PLATE: Insulation system fasteners and metal stress plates.
- b. #14 MP FASTENER and 3 IN INSULATION PLATE: Insulation system fasteners and metal stress plates.
- c. #15 HD FASTENER and 3 IN INSULATION PLATE: Insulation system fasteners and metal stress plates.
- d. TRUFAST Versa-Fast Fastener and Plate: Insulation system fasteners and metal stress plates.

3. **THERMAL BARRIER POLYURETHANE FOAM INSULATION ADHESIVE**

- a. IMPERMITEK INSULATION ADHESIVE: Two-component, polyurethane foam insulation adhesive, applied in ribbons from cartridges or two-component bulk packaging with pump-driven delivery system.
 - i. Ribbon size: 1/2 in to 3/4 in wide.
 - ii. Ribbon spacing: As required to meet specified wind uplift resistance performance.
 - a) Field of Roof (Zone 1): 12 in on-centers
 - b) Perimeter of Roof (Zone 2): 6 in on-centers
 - c) Corners of Roof (Zone 3): 4 in on-centers .

B. **SBS SELF-ADHERED BASE PLY:**

1. IMPERMITEK SA STANDARD BASE PLY: SBS-modified bitumen, self-adhesive membrane with release film on the bottom surface and a sanded top surface. Glass fiber reinforcement. Meets or exceeds ASTM D6163, Type I, Grade S, per ASTM D5147 test methods:
 - a. Thickness: 87 mils (2.2 mm)
 - b. Width: 39.4 in (1 m)
 - c. Length: 49.2 ft (15 m)
 - d. Roll weight: 73 lb (33.3 kg)
 - e. Net mass per unit area, lb/100 sq ft (g/sq m): 45.5 lb (2220 g)
 - f. Peak load @ 0°F (-18°C), lbf/in (kN/m): MD 100 lbf/in (17.5 kN/m), XMD 90 lbf/in (15.8 kN/m)
 - g. Elongation at peak load @ 0°F (-18°C), lbf/in (kN/m): MD 4%, XMD 4%
 - h. Peak load @ 73.4°F (23°C), lbf/in (kN/m): MD 50 lbf/in (8.8 kN/m), XMD 40 lbf/in (7.0 kN/m)
 - i. Elongation at peak load @ 73.4°F (23°C), lbf/in (kN/m): MD 5%, XMD 4%
 - j. Ultimate Elongation @ 73.4°F (23°C), lbf/in (kN/m): MD 45%, XMD 45%
 - k. Tear Strength @ 73.4°F (23°C), lbf (N): MD 60 lbf (267 N), XMD 60 lbf (267 N)
 - l. Low temperature flexibility, °F (°C): MD/XMD: -15°F (-26°C)
 - m. Dimensional stability, %: MD/XMD: Less than 0.1%
 - n. Compound stability, °F (°C): MD/XMD: 250°F (121°C)

2. IMPERMITEK SA FOIL-FACED BASE PLY: SBS-modified bitumen, self-adhesive membrane with release film on the bottom surface and a laminated foil film top surface. Glass fiber reinforcement. Meets or exceeds ASTM D6163, Type I, Grade S, per ASTM D5147 test methods:
 - a. Thickness: 24 mils (0.6 mm) minimum
 - b. Width: 39.4 in (1 m)
 - c. Length: 49.2 ft (15 m)
 - d. Roll weight: +/-62 lb (+/-28 kg)

C. **COLD LIQUID APPLIED FIELD & FLASHING MEMBRANE:**

1. **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

2.3. **ACCESSORIES**

A. **PRIMERS:**

1. IMPERMITEK SA STANDARD PRIMER: Rapid curing, spray or roller applied high-performance polymeric primer for bonding the IMPERMITEK Carrier membranes and vapor control layers to a variety of substrates.
 - a. Color: Copper/Green
2. IMPERMITEK SA CANISTER PRIMER: Rapid curing, self-contained canister spray applied high-performance polymeric primer for bonding the IMPERMITEK Carrier membranes and vapor control layers to a variety of substrates.
 - a. Color: Black
3. IMPERMITEK SA LVOC PRIMER: Rapid curing, spray or roller applied high-performance synthetic polymer-based low VOC primer for bonding the IMPERMITEK Carrier membranes and vapor control layers to a variety of substrates.
 - a. Color: Copper
4. IMPERMITEK SA ZERO PRIMER: Rapid curing, spray or roller applied high-performance synthetic polymer-based zero VOC primer for bonding the IMPERMITEK Carrier membranes and vapor control layers to a variety of substrates.
 - a. Color: Copper
5. IMPERMITEK SA H2O PRIMER: Rapid curing, spray or roller applied high-performance water-based polymer emulsion zero VOC primer for bonding the IMPERMITEK Carrier membranes and vapor control layers to a variety of substrates.
 - a. Color: Blue
6. 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
7. IMPERMITEK POROUS SURFACE PRIMER: Rapid curing, polymethyl methacrylate (PMMA) liquid resin used to promote adhesion of IMPERMITEK membranes over approved porous and coverboard substrates.
 - a. Color: White

8. IMPERMITEK METAL DETAILING PRIMER: One component primer used to improve the adhesion of IMPERMITEK membranes to metal substrates.
 - a. Color: Black
9. IMPERMITEK SINGLE PLY/PLASTIC PRIMER: One component moisture curing primer used to improve the adhesion of IMPERMITEK membranes to single-ply membranes.
 - a. Color: Yellowish
10. IMPERMITEK QUICK DRY 2-PACK EPOXY PRIMER: Low odor, two-part, epoxy-based primer for a variety of approved substrates.
 - a. VOC content: <100 g/L
 - b. Color: Beige
11. AC TECH 2170 FC Primer: Low odor, two-component, 100% reactive solids 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
 - ii. Color: Yellowish

B. **CATALYST:**

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

C. **REINFORCING FABRIC:**

1. IMPERMITEK TEKMAT 225 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 225 g/m²
 - b. Width: 38 in (96.5 cm), 38 in (96.5 cm)
 - c. Length: 492 ft (150 m), 172.6 ft (52.6 m)
2. IMPERMITEK TEKMAT 450 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 450 g/m²
 - b. Width: 38 in (96.5 cm), 37.4 in (96.5 cm)
 - c. Length: 268 ft (81.8 m), 103.6 ft (31 m)

3. IMPERMITEK TEKMAT FLASHING 450 REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in 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 IR-26 liquid applied membrane and flashing applications.
 - a. Weights: 450 g/m²
 - b. Width: 3 in (75 mm)
5. Length: 360 ft (110 m)
6. IMPERMITEK TEKMAT SMOOTH REINFORCEMENT: Non-woven chop strand fiberglass mat reinforcement used in IR-26 liquid applied flashing applications.
 - a. Weights: 100 g/m²
 - b. Width: 6 in (150 mm)
 - c. Length: 328 ft (100 m)

D. **CLEANER:**

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

E. **GENERAL PURPOSE SEALANT**

1. IMPERMITEK APPROVED SEALANT: General purpose, paintable, gun-grade, elastomeric, polyether moisture curing sealant for sealing terminations, Kynar 500 PVDF, horizontal and vertical construction joints.
 - a. VOC Content: 20 g/L or less.
 - b. Meets or exceeds ASTM C920, Type S, Grade NS, Class 50.
 - c. Standard color, [custom color](#).

F. **AESTHETIC SURFACING & WALKWAY PROTECTION:**

1. *IMPERMITEK IMPERMIGRIP LT (Light Texture): Rapid curing, polymethyl methacrylate (PMMA) pigmented resin with integrally mixed medium grain aggregate for slip resistant traffic surfacing and walkways.*
2. *IMPERMITEK IMPERMIGRIP HT (Heavy Texture): Rapid curing, polymethyl methacrylate (PMMA) pigmented resin with integrally mixed coarse grain aggregate for slip resistant traffic surfacing and walkways.*
3. *IMPERMITEK IMPERMIFINISH (smooth): Rapid curing, polymethyl methacrylate (PMMA) pigmented resin used as an aesthetic color finish.*

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

1. IMPERMITEK PASTE: 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.

2.4. **ROOF INSULATION COMPONENTS**

A. **RIGID INSULATION**

1. EXTRUDED POLYSTYRENE INSULATION (XPS):
 - a. IMPERMITEK SUPPLIED XPS (or as approved equal by membrane manufacturer), extruded polystyrene insulation board for waterproofing assemblies meeting ASTM C-578 *Type VII* criteria.
 - i. Thickness: Total thickness to meet specified insulation system total thermal resistance 'R' value of *R-30*.
 - ii. Aged Thermal Resistance (ASTM C518): R-5 per inch (RSI 0.87 per 25 mm).
 - iii. Board Size: [24 inch (610 mm)] wide, 96 inch (2440 mm) long, [*1.5" (38 mm)*] [*2.0" (50 mm)*] [*3" (75 mm)*] thick.
 - iv. Compressive Strength: Minimum 60 psi (414 kPa).

- v. Water Absorption (ASTM C272): 0.3% by volume maximum.
- vi. Edges: Square.
- vii. Water Vapor Permeance (ASTM E96): less than 0.8 perm max.
- viii. Flame Spread/Smoke Developed Values (ASTM E84): 15/165.
- ix. Certified by foam manufacturer to be CFC free.

2.5.

A.

**ROOF DRAINAGE COMPONENTS
PREFABRICATED DRAINAGE MAT**

1. IMPERMITEK SUPPLIED DRAIN MAT: Composite drainage board consisting of a post-industrial recycled polypropylene core of fused, entangled filaments covered with a geo-composite filter fabric on its upper surface to allow water to pass into the drainage core while restricting the movement of soil particles and suitable for use in select vertical and horizontal applications and shall be manufactured by the membrane supplier:
 - a. Thickness: 0.40 in
 - b. Dimensions: 48 in. x 100 ft
 - c. Flow rate: 135 gal/min/sf
 - d. Puncture strength: 310 lbs
 - e. Trapezoid tear strength: 50 lbs

B.

FILTER FABRIC

1. IMPERMITEK SUPPLIED FILTER FABRIC: Non-recycled polypropylene, staple fiber, needle-punched nonwoven geotextile designed to separate the growth medium and/or pavers from drainage system.
 - a. Length: 360 ft
 - b. Width: 6.25 ft
 - c. Flow rate: 140 gpm/ft²
 - d. Tensile strength: 100 lbs
 - e. Elongation: 80%

A.

ROOF DRAIN INSPECTION CHAMBER (prefabricated):

1. Inspection chamber to fit over roof drains in order to protect drains from debris and particles that impact normal drain operation.
 - a. IMPERMITEK SUPPLIED INSPECTION CHAMBER
 - i. Material: aluminum
 - ii. Colors: mill finish, black

- iii. Sizes: 12 x 12 in (300x300mm), 24 x 24 in (600x600mm), custom order
- iv. Height: 3 in (75mm), 3.5 in (88mm), 4 in (100mm), 4.25 in (106mm), 4.5 in (113mm), 5.5 in (138mm), 6.5 in (163mm), 7.5 in (188mm), 8.5 in (213 mm) standard or as required custom order or with inspection chamber extensions
- v. Thickness: 0.21 in (0.53 mm)
- vi. Flow rate: 15 gal/min/ft (56.78 l/min/m)

D. **ROOF DRAIN BOX (prefabricated):**

- 2. Drain box to fit over roof drains with narrow slots on the sidewalls and small holes on the top cover designed to allow a continuous flow of water to the roof drains while blocking debris and particles.
 - a. **IMPERMITEK SUPPLIED DRAIN BOX**
 - i. Material: recycled acrylonitrile-butadiene-styrene (ABS) plastic
 - ii. Color: black
 - iii. Sizes: 14.5 (37mm) x 14.5 in (37 mm)
 - iv. Height: standard 4 in (100mm) up to 32 in (800 mm) with extension kits

2.6. **PAVER OVERBURDEN COMPONENTS**

A. **ADJUSTABLE PEDESTALS AND SHIMS**

- 1. **PEDESTALS**
 - a. **IMPERMITEK SUPPLIED PEDESTALS:**
 - i. Height and slope adjustable pedestal for paver and decking support engineered to support pavers and decking. Height range is 0.5 in (13 mm) to 11 in (279 mm). Field installed extenders allow heights up to 39 in (991mm). Accessories include top and bottom slope-correctors, spacer tabs, height extenders and joist holders.

B. **ARCHITECTURAL PAVERS**

- 1. Approved WAUSAU TILE, WESTILE, SUNNY BROOK PRESSED CONCRETE or as approved equal architectural precast concrete pavers with beveled edges:
 - a. Nominal size: 24 in. x 24 in. x 2 in thick
 - b. Compressive strength: 8,500 psi per ASTM C-140; 1750 pounds minimum center load required
 - c. Flexural strength: 1100 psi per ASTM C-293
 - d. Water absorption: ≤ 5% per ASTM C-140
 - e. Freeze-thaw: no breakage and not more than 1% loss in dry weight after 50 cycles in accordance with ASTM C-67
 - f. Adjustable height and fixed height pedestals supplied thru membrane manufacturer

- g. Color and finish: [Contact manufacturer](#)

2.7. GREENROOF COMPONENTS

A. GROWING MEDIA (Engineered Soil)

1. GROWING MEDIA

- a. Certified green roof growing medium expressly engineered for extensive green roof applications of up to 6 inches in depth in which sedum, alpine and other drought-tolerant plants are to be used and in which little or no supplemental irrigation is to be provided; manufactured in strict accordance with FLL guidelines for the proper balance of water, drainage, pore (air) space, nutrient and hydrological properties for optimal plant establishment and growth.

B. PLANTING MATERIALS

- 1. Provide plants selected by the landscape architect or landscaping professional as required for the intended landscape plan and growing region.

a. SEDUM MATS

- i. Mats composed of a variation of sedum mixtures that are suitable for various conditions grown with a blend of organic and inorganic materials designed for minimal decomposition and maximum plant growth.

- a) Core Material: Biodegradable coconut fiber
- b) Length: 6.25 ft (1.9 m)
- c) Width: 4 ft (1.2 m)
- d) Thickness: 0.75 in (19 mm)
- e) Saturated weight 5 lb/in/ft² (24.7 kg/25 mm/m²)

b. SEDUM TILES

- i. Sedum tiles are composed of a variety of foliage options that are designed to offer immediate coverage in any environment for vegetative roof systems that require minimal maintenance after installation.

- a) Core Material: Biodegradable coconut fiber
- b) Length: 12 in (305 mm)
- c) Width: 24 in (610 mm)
- d) Fiber/soil Base Thickness: 1.0 in (25 mm)
- e) Saturated weight 5.48 lb/in/ft² (59 kg/25 mm/m²)

- f) Vegetation coverage: 95%
- c. VEGETATION (By Others)
 - i. Provide plants selected by the landscape architect or landscaping professional as required for the intended landscape plan and growing region.

1. **IMPERMITEK SUPPLIED Edge Restraint**

- a. Material: Extruded recycled Aluminum, Type 6063
- b. Dimensions: Various heights from 3.5 in (89mm) to 8.5 in (216mm), with the return leg varying by height. Sold in 96 in (2438mm) lengths.
- c. Drainage: 8 slots/linear foot, 5/16 in (8mm) W x 1-1/4 in (32mm) H, at base of vertical leg
- d. Installed shape: Can be installed straight, or field-modified into curvilinear shapes.
- e. Attachment: Clips and bolts, included
- f. Finish: Mill Finish is standard or optional Black Finish available on request.

B. **ROOT BARRIER**

- 1. Puncture, tear, and UV-resistant, low-density polyethylene sheet, taped at all seams, to provide a barrier against root penetration.
 - a. IMPERMITEK SUPPLIED ROOT BARRIER:
 - i. Thickness: 30 mil (0.76 mm)
 - a) Dimensions: 75 ft (22.9 m) x 10.0 ft (3.0 m)
 - b) Tensile strength at break 1 in, per ASTM D6693: 126 lbf.
 - c) Elongation at break, percentage, per ASTM D6693: 800%
 - d) Tear Resistance, per ASTM D1004: 17 lbf
 - e) Hydrostatic pressure resistance, per ASTM D751: 170 psi
 - f) Puncture Resistance, per ASTM D4833: 45 lbf
 - b. IMPERMITEK SUPPLIED SEAM TAPE:
 - i. High performance, low-residue, one-sided adhesive seam cover-tape, with low water vapor permeance.
 - a) Material: Polyethylene
 - b) Tensile Strength: 24.0 lbf/in (4.2 kN/m), per ASTM D1000.
 - c) Water Vapor Permeance, (perms): < 0.001 perm, per ASTM E96.

- d) Roll dimensions: 4 in (96 mm) x 180 ft (54.8 m).
- e) Thickness: 7.5 mils (0.19 mm)
- f) Adhesive thickness: 3.0 mils (0.076 mm)
- g) Operating Temperature Range 32 to 160°F (0 to 70 °C)
- h) Elongation percentage: 70%, per ASTM D1000

2.8. 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. Roof 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 reroofing applications, the existing roof 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 in (25 mm) wide bond breaker tape followed with minimum 6 in (150 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. Acceptable Rigid Insulation & Roof Cover Boards:

- a. After panels, fill joint gaps, holes, and cracks with proprietary PMMA paste or PMMA mortar. All joints must be covered with minimum 6 in (150 mm) wide strips of cold liquid applied reinforced waterproofing membrane centered over joint.

1. Tie-In to Emulsion Coated or Smooth APP Modified Bitumen Membranes:

- a. The top surface of existing emulsion coated, or smooth APP modified bitumen membrane shall be broadcast to excess with #1 (0.7 - 1.2 mm) kiln-dried quartz silica. Liquefy the top surface of the in-place membrane using a torch and broadcast silica aggregate into the liquid asphalt to excess. After the asphalt has cooled, remove all loose granules, dust, dirt, or debris from the surface of the membrane by broom, blower or power vacuuming.
- 2. 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. THERMAL BARRIER APPLICATION

- A. Follow thermal barrier component product data sheets, published general requirements and approvals.
- B. Install all thermal barrier components on clean, dry, uniform and, properly prepared substrates.
- C. All thermal barrier boards shall be carefully installed and fitted against adjoining sheets to form tight joints.
- D. Thermal barrier boards that must be cut to fit shall be saw-cut or knife-cut in a straight line, not broken. Chalk lines shall be used to cut insulation components. Uneven or broken edges shall not be accepted. Remove dust and debris that develops during cutting operations.
- E. Stagger thermal barrier joints laterally as required.
- F. The finished thermal barrier system surface shall be tight to, and flush with, adjacent substrates to form a satisfactory substrate to install specified roof components, membrane and flashings.

3.5. THERMAL BARRIER FASTENER APPLICATION

- A. Fasten Thermal Barrier to the deck using specified insulation fasteners and plates.
- B. Evenly distribute fasteners as required by the board manufacturer's published requirements.

- C. Fasten the Thermal Barrier to meet the specified wind uplift resistance performance requirements and warranty requirements.
- D. Minimum fastening requirement:
 - 1. Field of Roof (Zone 1): 1 fastener per 0.00 square ft
 - 2. Perimeter of Roof (Zone 2): 1 fastener per 0.00 square ft
 - 3. Corners of Roof (Zone 3): 1 fastener per 0.00 square ft
- E. Minimum fastening requirement:
 - 1. Field of Roof (Zone 1): 00 fasteners per 4x8 ft board.
 - 2. Perimeter of Roof (Zone 2): 00 fasteners per 4x8 ft board.
 - 3. Corners of Roof (Zone 3): 00 fasteners per 4x8 ft board.
- F. For thermal barrier boards located partially within the defined perimeter and/or corners, install fastening for the entire board as specified herein.

3.6. THERMAL BARRIER ADHESIVE APPLICATION

- A. Apply the specified two-component insulation adhesive to adhere subsequent insulation Layers and cover-board to the base layer insulation substrate.
- B. Follow insulation adhesive product data sheets and published general requirements for installation requirements.
- C. Apply insulation adhesive in uniform ribbons, 1/2 in to 3/4 in wide.
- D. Immediately install insulation components into insulation adhesive and apply weight to ensure the materials maintain full contact with all ribbons for complete adhesion. Do not allow insulation adhesive to skin-over before placing the insulation materials into the adhesive.
- E. Adhere the insulation system to meet the specified wind uplift resistance performance and specified warranty requirements.
- F. Minimum insulation adhesive ribbon spacing:
 - 1. Field of Roof (Zone 1): 12 in on-centers.
 - 2. Perimeter of Roof (Zone 2): 6 in on-centers.
 - 3. Corners of Roof (Zone 3): 4 in on-center

3.7. 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.

3.8. **SBS SELF-ADHERED VAPOR BARRIER/TEMPORARY WATERPROOFING BASE-PLY PRIMER APPLICATION**

- A. Wood roof decks, gypsum thermal barriers and other roof substrates require specified self-adhesive primer for self-adhered SBS membrane. Refer to manufacturer's published requirements and agency approvals.
- B. Where primer is required, apply specified self-adhesive primer using roller or spray. Ensure primer is tacky to-the-touch, but not wet. Primer should not transfer to the fingertips when touched. Do not proceed if primer is wet or becomes fully dry and dirty. If primer becomes fully dry, dirty and loses all tack, re-prime the substrate as necessary to achieve membrane adhesion.
- C. Examine all substrates, and conduct adhesion peel tests as necessary, to ensure satisfactory adhesion is achieved.
- D. Project conditions vary throughout the day. Monitor changing conditions, monitor the drying time of primers, and monitor the adhesion of the membrane. Adjust primer and membrane application methods as necessary to achieve the desired results.

3.9. **SBS VAPOR BARRIER/TEMPORARY WATERPROOFING BASE-PLY APPLICATION (SELF-ADHESIVE APPLIED)**

- A. Follow material product data sheets and published general requirements for installation instructions.
- B. Ensure environmental conditions are satisfactory, and will remain satisfactory, during the application of the self-adhesive membrane.
- C. Unroll membrane onto the roof surface and allow time to relax prior to installing the membrane.
- D. Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.
- E. Ensure all roofing and flashing substrates are prepared and acceptable to receive the self-adhesive membrane.
- F. Ensure primer is tacky to-the-touch, but not wet. Primer should not transfer to the fingertips when touched. Do not proceed if primer is wet or becomes fully dry and dirty. If primer becomes fully dry, dirty and loses all tack, re-prime the substrate as necessary to achieve membrane adhesion.
- G. Cut rolls to working lengths and widths to conform to rooftop conditions and lay out to always work to a selvage edge.
- H. Ensure membrane side-laps and end-laps are maintained.

- I. Peel the release film from the underside of the membrane. Press and adhere the leading edge of the membrane to the substrate but leaving the 6 in (150 mm) end-lap un-adhered in order to heat weld the end-lap.
- J. As the release film is peeled away, use a weighted roller to firmly set the sheet in place. Ensure full contact is made between the ply and the substrate for full adhesion. Use a hand-roller to roll-in vertical flashings and confined areas to firmly apply pressure.
- K. At the 6 in (150 mm) end-laps, use a torch or hot-air welder to melt plastic burn-off film from the top surface where present. Embed granules or otherwise remove surfacing where present using a torch or hot-air welder. For sanded membrane, specified cold adhesive may be used to adhere end-laps. Adhere all base ply and Cap Sheet end-laps using torch or hot-air welder or adhere using specified cold adhesive.
- L. At 6 in end-laps, cut a 45-degree dog-ear away from the 3 in (75 mm) selvage edge, or otherwise ensure the membrane is fully heat-welded or adhered watertight at all T-joints.
- M. Offset self-adhered end-laps 3 ft (1 m).
- N. Each day physically inspect all side and end-laps, and ensure the membrane is watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are fully sealed.
- O. Inspect the installation each day to ensure the plies are fully adhered. Repair all un-adhered voids, wrinkles, open laps and all other deficiencies.
- P. Offset cap sheet side and end-laps away from the base ply laps so that cap sheet laps are not located within 18 in (450 mm) of base ply laps.
- Q. Follow material product data sheets and published general requirements for installation instructions.

3.10. **PMMA PRIMER APPLICATION (IMPERMITEK GENERAL PRIMER & IMPERMITEK POROUS 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.

3.11.

EPOXY PRIMER APPLICATION (IMPERMITEK QUICK DRY 2-PACK EPOXY PRIMER)

A. Low Odor 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 temperature to reduce potential for pinholes from “off-gassing” and as required to enhance adhesion of new specified waterproofing materials.*
3. *Apply primer using 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. *When primer will be left exposed beyond recommended recoat times, 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.*
5. *Project conditions vary throughout the day. Monitor changing conditions, and the curing time of primers.*
6. *Allow primer to fully cure and remove excess aggregate before membrane application.*

3.12.

MOISTURE MITIGATION EPOXY PRIMER APPLICATION (AC TECH 2170 FC EPOXY PRIMER)

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 temperature 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 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 and remove excess aggregate before membrane application.*

3.13. **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.

3.14. **SUBSTRATE PATCHING, LEVELING & REPAIR (IMPERMITEK PASTE 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.

2.

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.

3. **FLASHING MEMBRANE APPLICATION (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 ½ 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 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.

4. **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.

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

NOTE: Select either FLOOD TEST or ELECTRIC FIELD VECTOR MAPPING TEST for waterproofing membrane continuity testing and delete other section as required.

A. **FLOOD TEST**

- 1. A flood test of the completed membrane and flashing system shall be conducted prior to the installation of any overburden. The flood test shall be of a 24-hr. minimum duration and shall apply a water head of 2" over the entire application area. Any incidents of water entry shall be evaluated, and all necessary repairs conducted, followed by an additional flood test.

B. **ELECTRIC FIELD VECTOR MAPPING (EFVM) TEST**

- 1. In General: After installing horizontal membrane and before placing overburden, verify installed membrane is waterproof. Provide testing to verify membrane is free of any holes, open seams and capillary defects that will allow water to pass.
- 2. Utilize electrical conduction method EFVM (Electric Field Vector Mapping) as provided by authorized and licensed leak detection company.
- 3. Installation of EFVM impulse conductor wire around perimeter of area to be tested. The testing agency will determine size and shape of area. Areas will typically range between 2,000 SF and 7,500 SF. The conductor wire will consist of braided polyethylene (1.5 mm diameter) interwoven with a minimum of nine (9) strands of stainless wire. The conductor wire will have a tensile strength of not less than 180 lbs.

4. Place conductor wire four (4") inches from perimeter and secure against accidental movement or damage. Place it so not to create a tripping hazard. Place wire directly on membrane.
5. Isolate all metal items contacting the membrane by placing isolation strands of conductor wire to isolate the field or by removing the metal items temporarily if possible.
6. Isolate field of membrane from contact with grounded soil or structure contacting the membrane by placing isolation strands of conductor wire to isolate the field.
7. Wet the rest area with potable water sufficiently to create a continuous conducting "plate" above the membrane.
8. Attach EFVM impulse generator to conductor wire with removable connectors and to ground or building structure creating a potential circuit. (The circuit will complete if water finds a path to ground by way of a breach in membrane.)
9. Deliver a one second long 40-volt potential electrical impulse to the conductor wire at an average rate of one impulse every three seconds.
10. Utilizing an EFVM potentiometer and two probes placed at the surface of the membrane detect the presence or absence of electrical flow across the surface to the membrane.
11. If there is no flow detected after a systematic search then the certified inspector shall report the installed membrane in that area tested free of holes, seam and capillary defects and is therefore waterproof at that time.
12. If there is flow detected during the search, then the certified inspector shall work to identify the source of electricity and therefore the breach in the membrane. The technician shall report to the roofing contractor immediately, if possible, the exact location of any defects on the installed membrane in that area tested.
13. Defects found shall be repaired and retested.
14. The technician providing the EFVM testing shall provide a report of each day's test results containing a written description and photograph of all defects and any corrections made and a schematic CAD drawing indicating location of stationary conductor wire and of any defects found in testing to within one (1") inch of accuracy. This report shall be made in hard copy and submitted to the Architect and Owner.

12. **WATERPROOFING MEMBRANE PROTECTION (General)**

- A. Protect waterproofing membrane to avoid damage by other trades and during placement of overburden. Place protection layer immediately upon curing of waterproofing membrane. Drainage composite or protection boards may be installed the same day the membrane is applied or immediately after flood testing when required.
 1. Horizontal applications: Use a drainage composite, or 1/8" to 1/4" (3.2 to 6.4 mm) asphaltic hardboard. When reinforced concrete slabs are placed over the membrane, use drainage composite or 1/4" (6.4 mm)

hardboard. Where required, adhered protection board to waterproofing membrane using Membrane Manufacturers proprietary acrylic resin paste or approved adhesive.

2. Vertical applications: Use drainage composite, 1 in (25.4 mm) expanded polystyrene or extruded polystyrene that has a minimum compressive strength of 10 lb/in² (69 kN/m²). If extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 2 in (51 mm) in diameter. Adhere drainage composite or polystyrene protection board to waterproofing membrane as required using Membrane Manufacturers proprietary acrylic resin paste or an approved adhesive.

12.

OVERBURDEN INSTALLATION – VEGETATIVE ROOF AREAS

A. ROOT BARRIER:

1. Refer to drawings to determine location and placement of the specified root barrier.
2. Ensure waterproofing is fully cured for 24 hours or more before applying root barrier and subsequent materials.
3. Where specified, ensure protection course is in place prior to installing the root barrier.
4. Thoroughly inspect waterproofing and protection course, and make all necessary repairs, prior to installing the root barrier.
5. Unroll root barrier onto substrate, overlap all seams 12 to 24 inches at all laps.
6. Ensure root barrier is applied over, and beyond all surfaces exposed to potential root sources.
7. Tape all overlapping seams using specified seam tape, or hot-air weld seams.
8. Ensure there are no open laps nor exposed waterproofing surfaces prior to installing subsequent materials.

B. DRAINAGE MAT:

1. Install course of drainage mat over horizontal surfaces. Allow to lay flat and overlap min. three (3) inch all side laps or as required by membrane's manufacturer.
2. Cut and fit drainage mat per manufacturer's specifications to fit the perimeter and penetrations.
3. Bond all overlap edges to adjacent drainage mat course with an acceptable adhesive if required to ensure geotextile integrity.

C. ROOF DRAIN & INSPECTION CHAMBER INSTALLATION

1. Roof drain boxes and inspection chambers shall be applied over drains prior to application of media or ballast to protect the drain from becoming blocked by media or ballast.

2. Always install over a drainage layer to protect the waterproofing membrane. Filter fabric should be installed along the vertical drainage slots to prevent debris, media, or ballast from entering the Inspection Chamber.
3. Fit all drains with roof drain maintenance boxes or chambers extended above soil level to allow periodic inspection and cleaning of drains.
4. After installation, immediately install planting media or ballast to keep inspection chambers from movement or displacement.

D. **FILTER FABRIC:**

1. Cut and fit filter fabric per manufacturer's specifications to fit the perimeter and penetrations overlapping onto drainage mat.
2. Install filter fabric below soil layer, lapping adjacent rolls 4" (10 cm) minimum and turned up all vertical surfaces 6" (15 cm) minimum beyond anticipated soil level. After installation of soil, excess filter fabric may be trimmed down to soil level. The installation of the filter fabric is to be immediately followed by the installation of the topsoil planting material to prevent displacement.
3. Bond all overlap edges to adjacent filter fabric course as recommended or required to ensure geotextile integrity.

E. **GROWING MEDIA PLACEMENT**

1. For all areas other than where pre-vegetated tray systems are used, install engineered growing media at depths required. Use care during backfill operation to avoid damage to waterproofing membrane, protection board and drainage system. Follow generally accepted practice for backfill and compaction. Backfill should be added in 6 in to 12 in (150 to 300 mm) lifts and should be placed as soon as possible after installation of the waterproofing membrane and protection layer. Fit all drains with maintenance boxes/grills extended above engineered soil level to allow inspection and cleaning of drains.

F. **LANDSCAPE PLANT & VEGETATION INSTALLATION**

1. GENERAL:
 - a. Supply and plant the specified vegetation as selected by the landscape architect or landscaping professional.
 - b. Water immediately after installation and consult maintenance guidelines for continued care.
2. SEDUM MAT & SEDUM TILES INSTALLATION
 - a. Place Sedum Mats and Sedum Tiles directly over prepared growing media.

1. **OVERBURDEN INSTALLATION - PAVER**

A. **DRAINAGE MAT:**

1. Install course of drainage mat over horizontal surfaces. Allow to lay flat and overlap min. three (3) inch all side laps or as required by membrane's manufacturer.
2. Cut and fit drainage mat per manufacturer's specifications to fit the perimeter and penetrations.
3. Bond all overlap edges to adjacent drainage mat course with an acceptable adhesive if required to ensure geotextile integrity.

B. **FILTER FABRIC INSTALLATION**

1. Cut and fit filter fabric per manufacturer's specifications to fit the perimeter and penetrations overlapping onto drainage mat.
2. Install filter fabric below soil layer, lapping adjacent rolls 4" (10 cm) minimum and turned up all vertical surfaces 6" (15 cm) minimum beyond anticipated soil level. After installation of soil, excess filter fabric may be trimmed down to soil level. The installation of the filter fabric is to be immediately followed by the installation of the topsoil planting material to prevent displacement.
3. Bond all overlap edges to adjacent filter fabric course to ensure geotextile integrity.

C. **PAVERS PLACEMENT**

1. Install subsequent overburden materials as soon as possible.
2. Install finish pavers, on adjustable pavers support pedestal and leveling shims as required, in accordance with Manufacturer's recommendations and architectural layout.

12. **AESTHETIC SURFACING & FINISH (Optional-Exposed Roof Areas)**

A. **GENERAL:**

1. Refer to manufacturer's detail drawings, product data sheets and published general requirements for application rates and specific installation instructions.
2. Layout and install all surfacing and finish using manufacturer's recommended practice and procedure with appropriate masking for clean lines between sections. Where possible use color breaks reviewed and approved by the owner and/or owners' representative. Color breaks should help improve appearance, hide minor variations in color or texture and allow for localized repairs of the surfacing and finish if needed.
3. Install surfacing and finish layers over fully cured membrane layer.
4. The substrate shall be dry and free of any dust, loose particles, or contaminants.
5. Mix resins using a slow speed agitator prior to pouring into a larger container.
6. Mix surfacing or finish resins with 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.

7. Apply the catalyzed surfacing or finish resin onto the substrate as recommended, working the material into the surface for complete coverage and full adhesion.
8. At tie-ins and previously applied membrane, clean cured surface with specified cleaner before application of subsequent resin materials.
9. Traffic Surfacing and Finish are semi-rigid materials formulated for durability and performance. As semi-rigid components, when applied over softer or more flexible materials, cracks and micro fissures may occur in the surfacing and finish layer. Although this does not affect the system performance, it will impact the cosmetic appearance of the surfacing and finish. To help reduce or avoid potential cosmetic cracks or fissures, surfacing and finish should not be applied over areas of potential movement including the following:
 - a. Hold surfacing & finish back ½ in from horizontal to vertical transitions at walls, penetrations, and leading edge of any bond breaker.
 - b. Do not apply surfacing & finish over any metal components where stripped in with membrane to allow for movement.
 - c. Do not apply surfacing & finish over expansion joints or other joints where movement is possible.

*****CHOOSE ONE OF THE FOLLOWING*****

B. SURFACING – AESTHETIC COLOR FINISH

1. Provide waterproofing manufacturer's proprietary monochromatic color finish resin to create a smooth and readily cleanable surface. This surfacing option is not recommended where slip-resistant surfaces are required.
 - a. IMPERMITEK IMPERMIFINISH Surfacing Layer
 - i. Apply an even topcoat of pigmented finish resin using a notched hard rubber squeegee at minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling.

C. SURFACING – TEXTURED FINISH

1. Provide waterproofing manufacturer's textured resin finish with integrally mixed aggregate to create a highly slip-resistant wearing surface.
 - a. IMPERMITEK IMPERMIGRIP LT (light textured) Surfacing Layer
 - i. Apply an even topcoat of pigmented textured finish resin using a flat or V-notched trowel at minimum recommended consumption. Use an appropriate roller to remove excess

resin or puddling. Roll textured finish resin in one direction, then roll in the cross direction to obtain a uniform finish. Immediately remove masking before surfacing resin cures.

D. SURFACING LAYER APPLICATION:

- a. Plan and tape-out the area of work in a checkerboard fashion using fiber reinforced masking tape. After mixing, apply surfacing resin to clean, prepared and dry substrate at the required consumption.
- b. Immediately remove masking before surfacing resin cures. Following cure, re-apply masking (back tape) at completed section of surfacing before continuing and applying subsequent sections of surfacing resin.

1. **ROOF WALKWAYS & PROTECTION (optional – Exposed Roof Areas)**

A. Where walkways are required for normal rooftop traffic and as a protective layer to service all rooftop equipment, provide waterproofing manufacturers textured wearing coat with integrally mixed aggregate to create a highly slip-resistant wearing surface.

1. IMPERMITEK IMPERMIGRIP LT (Light Textured) or HT (Heavy Textured) Surfacing Layer
 - a. Mix and apply an even topcoat of pigmented textured finish resin using a flat or V-notched trowel at minimum recommended consumption. Use an appropriate roller to remove excess resin or puddling. Roll textured finish resin in one direction, then roll in the cross direction to obtain a uniform finish.
2. Walkway Surfacing Application:
 - a. Mask out walkway sections to be no longer than 10 ft (3 m), with a 6 in (150 mm) minimum gap between each section to allow for drainage.
 - b. Immediately remove masking before surfacing resin cures.

14. **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.

15. **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