

SECTION 07563
FLUID APPLIED ROOFING RESTORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single Ply Roof Restoration
- B. Accessories
- C. Edge Treatment and Roof Penetration Flashings

1.2 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry: Roof blocking installation and requirements.
- B. Section 07620 - Sheet Metal Flashing and Trim: Metal cap flashing and expansion joints.
- C. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- D. Section 07710 - Manufactured Roof Specialties: Counter flashing gravel stops, and fascia, scuppers, gutters and downspouts.
- E. Section 15430 - Plumbing Specialties: Piping vents and roof drains.

1.3 SYSTEM DESCRIPTION

- A. Single Ply Roof Restoration Renovation: work includes:
 - 1. Surface preparation: Remove membrane chalking, dust, dirt, and debris.
 - 2. Fascia Edges: Inspect and make repairs to membrane
 - 3. Parapets and Vertical Surfaces: Inspect and make repairs to any splits or membrane deterioration.
 - 4. Roof Repairs: Repair blisters, stressed or cracked membrane. Cut back, patch with new membrane
 - 5. Partial Reinforcement:
 - a. Base coat/ Install partial fabric reinforcement at all single ply membrane field/vertical flashing laps, side laps, end laps and details. Topcoat entire roof surface and flashings.
 - b. Metal Flashings Partial Reinforcement: Repair/Replace metal flashings, pitch pockets, etc.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit shop drawings including installation details of fluid applied roofing and flashing prior to job start.
- D. LEED Submittals: Provide documentation of how the requirements of Credit will be met:

1. List of proposed materials with recycled content. Indicate post-consumer recycled content and pre-consumer recycled content for each product having recycled content.
 2. Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content.
 3. Product reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- E. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, and color.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- G. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Manufacturer: Company specializing in manufacturing products specified in this section with documented ISO 9001 certification and minimum twelve years and experience.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.6 PRE-INSTALLATION CONFERENCE

- A. Convene a pre-roofing conference approximately two weeks before scheduled commencement of roofing system installation and associated work.
- B. Require attendance of installers of deck or substrate construction to receive roofing, installers of rooftop units and other work in and around roofing which must precede or follow roofing work including mechanical work, Architect, Owner, roofing system manufacturer's representative.
- C. Objectives include:
1. Review foreseeable methods and procedures related to roofing work, including set up

- and mobilization areas for stored material and work area.
2. Tour representative areas of roofing substrates, inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work.
 3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
 4. Review roofing system requirements, Drawings, Specifications and other Contract Documents.
 5. Review and finalize schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 6. Review required inspection, testing, certifying procedures.
 7. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
 8. Record conference including decisions and agreements reached. Furnish a copy of records to each party attending.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Storage temperatures should be between 60 degrees F to 80 degrees F (15.6 degrees to 26.7 degrees C). Indoor ventilated storage is recommended. Ensure jobsite storage is in a shaded and ventilated area. Do not store in direct sunlight. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Weather Condition Limitations: Product application must not be done when rain or other conditions such as fog or heavy dew are possible within a 24 hour period. Roof surface must be at least 6 Fahrenheit degrees or 3 Celsius degrees above the dew point and rising.
- C. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- E. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:

1. Close air intakes into the building.
 2. Have a dry chemical fire extinguisher available at the jobsite.
 3. Post and enforce "No Smoking" signs.
- F. Avoid inhaling spray mist; take precautions to ensure adequate ventilation.
- G. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75 degrees F (24 degrees C) and 50 percent relative humidity or until fully cured.
- H. Take precautions to ensure that materials do not freeze.
- I. Minimum temperature for application of White-Knight Plus/ White-Stallion Plus, White-Knight Plus WC and LiquiTec coatings is 50 degrees F (10 degrees C) and rising.

1.9 WARRANTY

- A. Warranty Period: 15 years.
1. Upon completion of the work, provide the Manufacturer's written and signed limited labor and materials Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
 - a. Single Ply Roof Restoration:
- B. Warranty Period: Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
1. Warranty Period:
 - a. 2 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The); 3800 E. 91st St., Cleveland, OH 44105. ASD. Toll Free: 800-321-9336. Phone: 216-641-7500. Fax: 216-641-0633. Web Site: <http://www.garlandco.com>.
- B. The De Soto #73 Schools is using the Omnia Partners Government Purchasing Alliance program for Roofing Supplies and Related Products and Services, as priced by and awarded to Garland/DBS, Inc., resulting from the competitively solicited Sealed Bid # PW1925 issued by the Racine County. The roofing installer is responsible for supplying the right quantity of these roofing materials to complete **(22' Roofing Projects)** as detailed in this specification and is responsible for obtaining any additional materials that are required to properly install the specified roofing systems at no additional charge to the Owner. All materials needed to complete this project that are not listed on the OMNIA Partners Government Purchasing List of Materials attachment provided in this specification, but that are required in this specification, must be supplied by the roofing installer and meet stated performance specification listed in this document.

2.2 SINGLE PLY ROOF RESTORATION

- A. LiquiTec:
1. Primer: Not Used.
 2. Base: LiquiTec Base or Liqui-Tec.
 3. Coating: LiquiTec or LiquiTec Base.
 4. Flashing: LiquiTec or LiquiTec Base.
 5. Partial Reinforcement: Fabric reinforcement over existing membrane seams and all

flashing penetrations.

- a. UniBond ST seam reinforcement tape.

2.3 ACCESSORIES:

- A. Roof Insulation: In accordance with Section 07220.
- B. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.
- C. Urethane Sealant - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
 1. Tensile Strength, ASTM D 412: 250 psi
 2. Elongation, ASTM D 412: 950%
 3. Hardness, Shore A ASTM C 920: 35
 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- D. Urethane Adhesive - Green-Lock Structural Adhesive: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.
 1. Elongation, ASTM D 412: 300%
 2. Hardness, Shore A, ASTM C 920: 50
 3. Shear Strength, ASTM D 1002: 300 psi
- E. Silicone Dampproofing - Seal-A-Pore HP: Transparent and colorless solution designed to damp-proof above grade masonry surfaces as recommended and furnished by the membrane manufacturer.
 1. Density @77 degrees F 8.4 lb/gal min.
 2. Viscosity (Zahn #2 cup) Typical 14 sec.
- F. Acrylic Damp-Proofing Tuff-Coat: Damp-proofing that provides heavy body protection while bridging small hair line cracks and masonry imperfections as recommended and furnished by the membrane manufacturer.
 1. Density @77 degrees F 12.25 lb/gal typical
 2. Viscosity, ASTM D 562: 95 KU
- G. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.
- H. Non-Shrink Grout: GarRock all-weather fast setting chemical action concrete material to fill pitch pans.
 1. Flexural Strength, ASTM C 78: (modified) 7 days 1100psi
 2. High Strength, ASTM C 109: (modified) 24 days 8400lbs (3810kg)
- I. Pitch Pocket Sealer - Universal Pitch-Pocket Sealer: Two-part, 100% solids, self-leveling, polyurethane sealant.
- J. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane manufacturer.

2.4 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple

pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.

- B. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- C. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- D. Drain Flashing should be 4lb (1.8kg) sheet lead formed and rolled.
- E. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Fabricated Flashing: Fabricated flashings and trim are specified in Section 07620.
 - 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- G. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
 - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 ROOF PREPARATION AND REPAIR

- A. General: All necessary field and flashing repairs must be done according to good construction practices, including the removal of all wet insulation and defective materials as identified through a moisture detection survey such as an infrared scan and replacement with like-materials.
 - 1. Remove damaged roof flashings from curbs and parapet walls down to the surface of the roof. Remove damaged existing flashings at roof drains and roof penetrations.
 - 2. Remove all wet, deteriorated, blistered or delaminated roofing membrane or insulation and fill in any low spots with like materials occurring as a result of removal work to create a smooth, even surface for application of new roof membranes.
 - 3. Install new wood nailers as necessary to accommodate insulation/recovery board or new nailing patterns.
 - 4. When mechanically attached, the fastening pattern for the insulation/recovery board shall be as recommended by the specific product manufacturer.
 - 5. Existing roof surfaces shall be primed as necessary and allowed to dry prior to installing the roofing system.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Repair all defects such as deteriorated roof decks, saturated materials, loose or brittle membrane or membrane flashings, etc. Verify that existing conditions meet the following requirements :
 - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
 - 2. Application of roofing materials over a brittle, damaged or poor condition roof membrane is not permitted.
- D. Remove all loose dirt and foreign debris from the roof surface. Do not damage roof membrane in cleaning process.
- E. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.
- F. Confirm local water run-off ordinances and restrictions prior to cleaning roof. Clean the entire roof surface by removing all dirt, algae, mold, moss, paint, oil, talc, rust or other foreign substance. Use a bio-degradable cleaner like Simple Green Oxy Solve when necessary and warm water. Scrub heavily soiled areas with a brush. Power wash roof thoroughly with an industrial surface cleaner equipped with one piece balanced spray rotating jets for streak free close contact cleaning. Rinse with fresh water to completely remove all residuals. Allow roof to dry thoroughly before continuing.
- G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects must be repaired/renovated and be made watertight. Any repairs must be with only with materials compatible with the fluid-applied roofing restoration system.

3.3 INSTALLATION

- A. General Installation Requirements:
 - 1. Install in accordance with manufacturer's current Application and Installation Guidelines and the NRCA Roofing and Waterproofing Manual.
 - 2. Adequate coating thickness is essential to performance. If the applicator is unfamiliar in gauging application rates, we suggest that a controllable area be measured and the specified material be applied. In all cases, all minimum specified material must be applied and proper minimum dry film thicknesses must be achieved. Care must be taken to ensure that all areas completed including all flashings, roof penetrations, etc. are coated sufficiently to ensure a watertight seal.
 - 3. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
 - 4. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
 - 5. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore adjacent work damaged by installation of the roofing system.
 - 6. All primers must be top coated within 24 hours of application. Re-prime if more time passes after priming.
 - 7. Keep roofing materials dry during application.
 - 8. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
 - 9. Coordinate roof accessories and miscellaneous sheet metal accessory items, including piping vents and other devices with work specified in other Sections under Related Work.
- B. Single Ply Roof Restoration: work includes:
 - 1. Surface preparation:

- a. Confirm local water run-off ordinances and restrictions prior to cleaning roof.
 - b. Clean the entire roof surface.
 - c. Use cured single ply membrane when large repairs are required
 - d. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. Repair all surface defects (cracks, blisters, tears) with similar materials.
 - e. Repair existing roof membrane that is not well secured to the roof deck, insulation or cover board.
 - f. Repair or replace loose seams with new cured single-ply material.
 - g. Significantly wrinkled single ply membrane areas must be cut out and replaced to ensure a smooth substrate.
 - h. Repair any single ply membrane that has shrunk and is tenting at walls.
 - i. Remove walkway pads and make necessary repair with cured single ply membrane.
 - j. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.
 - k. Previously coated roofs with well-adhered polyurethane or polyurea coating surfacing must be solvent-wiped with acetone after cleaning to reactivate surface for overcoating.
2. Flashing:
- a. Fascia Edges: Inspect and make repairs to membrane.
 - b. Parapets and Vertical Surfaces: Inspect and make repairs to any splits or membrane deterioration.
 - c. Metal Flashings: Repair/Replace metal flashings, pitch pockets, as specified.
3. Partial Reinforcement:
- a. Application:
 - 1) UniBond ST tape Method:
 - a) Verify the surface is clean and properly prepared.
 - b) Remove clear release liner from the back in workable sections.
 - c) Center 6 inch wide Unibond ST over the middle of lap. For other details requiring reinforcement such as drains, penetrations and curbs, use 12 inch wide UniBond ST.
 - d) Use care to install tape uniformly. Do not stretch or cause air pockets, wrinkles or fishmouths.
 - e) Apply pressure to tape starting at the center and work toward outside edge with a steel roller to activate the bonding process.
 - f) Inspect tape to ensure that it is properly installed. Verify edges are tightly fixed to surface. If any discrepancies are present, they must be repaired before the coating is applied.
 - g) After installing UniBond ST, saturate the tape's polyester surface with Coating and allow to dry.
 - b. Coating: Application of base and finish coats. Ensure the fluid-applied coverage rates are obtained throughout the entire roof surface.
 - 1) Apply Coatings in a uniform manner.
 - 2) Apply a base coat at 1.5 gallons per 100 SF over entire roof surface. Allow to dry before applying top coat.
 - 3) Use special attention to coating flashings and other critical areas to build adequate membrane thickness.
 - 4) Use multiple coats on verticals or steep slopes to prevent sagging.
 - 5) Apply a top coat at 1.0 gallons per 100 SF over the entire roof surface. Allow to dry.

3.4 REPAIR OF EDGE TREATMENT AND ROOF PENETRATION FLASHING

A. General

1. Repair flashing in accordance with the requirements/recommendations of the Membrane manufacturer and as indicated on the manufacturer's standard drawings. Provide system with base flashing, edge flashing, penetration flashing, counter flashing, and all other flashings required for a complete watertight system.
 2. Install and repair flashings concurrently with the roofing as the job progresses.
 3. Terminate flashings as required by the membrane manufacturer.
- B. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are provided as specified in Section 07710.
1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the National Roofing Contractor's Association "Roofing and Waterproofing Manual" as applicable.
- C. Liquid Flashing:
1. Mask target area on roof membrane with tape.
 2. Clean all non-porous areas with isopropyl alcohol.
 3. Apply 32 wet mil base coat of liquid flashing over masked area.
 4. Embed polyester reinforcement fabric into the base coat of the liquid flashing.
 5. Apply 32 wet mil top coat of the liquid flashing material over the fabric extending 2 inches (51 mm) past the scrim in all directions.

3.5 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove coating markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.6 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.7 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system.
- B. Perform field inspection and [and testing] as required under provisions of Section 01410.
- C. Correct defects or irregularities discovered during field inspection.

3.8 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Contractor, Architect, installer, installer of associated work, roofing system manufacturer's representative and others directly concerned with performance of roofing system.
- B. Walk roof surface areas, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. Identify all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. If core cuts verify the presence of damp or wet materials, the installer shall be required to replace the damaged areas at his own expense.
- D. Repair or replace deteriorated or defective work found at time above inspection as required to produce an installation that is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- E. Notify Architect upon completion of corrections.
- F. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

3.9 SCHEDULES

- A. Base:
 - 1. Base Coating: LiquiTec Base: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D 2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 193 lbf/in.
 - j. Toughness: (Fully Reinforced System): 46 in.-lbf/in²
 - k. Dry Film Thickness (Fully Reinforced System), 90-100 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. Flash Point: ASTM D 93, 110 degrees F min. (43 degrees C)
 - o. VOC: 0 g/l
 - p. Microbial Resistance: ASTM G21, No Microbial Growth
 - q. Water Leakage Resistance: ASTM D7281, Pass
- B. Reinforcement:
 - 1. UniBond ST: Fatigue resistant, polyester-faced adhesive tape.
 - a. Tensile Strength 4500 psi.
 - b. Elongation, 500%
 - c. Low Temperature Flexibility, -70 degrees F (-56.6 degrees C).
 - d. Service Temperature, -30 to 200 degrees F (-34.4 to 93.3 degrees C).
 - e. Permeance ASTM 96b, .001 perms.
 - f. Adhesion Greater than 20 lbs./in.
- C. Coatings:
 - 1. Coating: LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:

- a. Elongation, ASTM D 412: 800%
- b. Tensile Strength, ASTM D 412: 2500 psi
- c. Tear Resistance, ASTM D 624: 449 lbs./in
- d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
- e. Hardness, ASTM D2240 (Shore A): 80
- f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
- g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5147, 135 lb/in
- h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf
- i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 193 lbf/in.
- j. Toughness: (Fully Reinforced System): ASTM D 5147 46 in.-lbf/in²
- k. Dry Film Thickness (Fully Reinforced System), 90-100 mils
- l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
- m. Density @ 77 degrees F (25 degrees C), ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
- n. VOC: 0 g/l
- o. Microbial Resistance: ASTM G21, No Microbial Growth
- p. Water Leakage Resistance: ASTM D7281, Pass
- q. Initial Reflectance: 0.84
- r. Initial Emittance: 0.88
- s. Initial SRI: 105

D. Liquid Flashings

1. Coating: LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D 522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D 2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073, 274 lbf .
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073, 135 lbf.in .
 - j. Toughness: ASTM D 5147 46 in.-lbf/in² .
 - k. Dry Film Thickness (Fully Reinforced System), 70-80 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D7379, 231 lbf/in.
 - m. Density @ 77 degrees F (25 degrees C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. VOC: 0 g/l
 - o. Microbial Resistance: ASTM G 21, No Microbial Growth
 - p. Water Leakage Resistance: ASTM D7281, Pass
 - q. Initial Reflectance: 0.84
 - r. Initial Emittance: 0.88
 - s. Initial SRI: 105
2. Coating: LiquiTec Base:
 - a. Elongation, ASTM D 412: 800%
 - b. Tensile Strength, ASTM D 412: 2500 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D522: -60 degrees F (-51.1 degrees C)
 - e. Hardness, ASTM D2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D 5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D 5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D 4073,
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D 4073,
 - j. Toughness: ASTM D 5147 , 46 in.-lbf/in²

- k. Dry Film Thickness (Fully Reinforced System), 70-80 mils
- l. Lap Shear Strength (MB Seam with coating): ASTM D 7379, 231 lbf/in.
- m. Density @ 77 degrees F (25 degrees C). ASTM D 2939 9.6 lb./gal (1.2 g/m³)
- n. VOC: 0 g/l
- o. Microbial Resistance: ASTM G 21, No Microbial Growth
- p. Water Leakage Resistance: ASTM D7281, Pass

END OF SECTION