

SECTION 07563
FULLY REINFORCED FLUID APPLIED ROOFING RESTORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all labor, equipment, and materials to restore specified buildings. Contractor to install fluid-applied roofing restoration over the properly prepared roof system for McCabe Union Elementary School District.

****All products in bold italics will be furnished by McCabe Union Elementary School District. All products not in bold italics to be furnished by the Contractor. All products in bold italics to be manufactured by The Garland Company and purchased by MUESD using its authority under the CMAS schedule.****

Contract #: 4-20-56-0006B

- B. Scope of Work
1. Pressure wash roofing membrane with Simple Green, allow to dry. Properly dispose of any debris.
 2. Penetrations, vents, and curb corners to be sealed with white polyether mastic – ***KEE-Lock Mastic***. Curb corners to receive three-course application of ***KEE-Lock Mastic*** and mesh fabric – ***GarMesh 6.***”
 3. Cut open any blisters, splits, or damaged cap sheet. Prime with ***Garla-Prime VOC*** and then torch-apply new SBS-modified mineral cap sheet – ***StressPly IV Mineral*** - over the area using full width sheets only.
 4. Base Flashings: Reinforce all base flashing seams by applying a three-course application of ***LiquiTec Base*** and polyester – ***Grip Polyester Soft 6.***”
 5. Pipe Penetrations: All penetrations to be flashed in with lead jacks. Strip in with ***StressPly IV Mineral*** flashing ply. Clamp and caulk with urethane sealant – ***Tuff-Stuff MS True White.***
 6. Install polyurea base coat - ***LiquiTec Base*** - at 4.0 gallons per 100 square ft. over the entire roof surface (including penetrations) and base flashings and fully embed polyester – ***Grip Polyester Soft*** - into it while wet. The polyester should run 12” up the parapet walls.
 7. Allow 24 hours for cure time.
 8. Install polyurea top coat – ***LiquiTec*** - at rate of 2.0 gallons per 100 square ft. over the entire roof system. Coating must be back rolled.
 9. Coping: Wire brush and remove all loose paint. Seal all joints with urethane sealant - ***Tuff-Stuff MS True White.***
 10. Ventilated storage may be required and is the sole responsibility of the Contractor per Section 1.5. Contractor is responsible for all charges (including freight and tax) to replace any material that is damaged due to improper storing conditions.
 11. Install 561-C roof ladder with handrails by Alaco Ladder Company, or equal, to be installed on the Southeast side of Building 600.
 12. Coating must be mixed properly per instructions on Section 3.3, B., #4. If the coating appears yellow after application, it must be re-coated with ***LiquiTec*** at 2.0 gal per

100 square ft. Any additional material required to do so is the responsibility of the Contractor, including freight and sales tax.

13. Contractor to provide a 5-year warranty for labor.

1.2 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. Verification Samples: For each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, and color.
- D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- E. 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.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with 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.

1.4 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.

1.5 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. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- E. Storage temperatures should be between 60°F to 80°F (15.6° to 26.7°C) and not exceed 110°F (43.3°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. Contractor is responsible for any charges (including freight and tax) to replace any material that is damaged due to improper storing conditions.
- F. Owner reserves the right to have the Contractor store all OFCI materials on non-school property at no additional charge to the District.

1.6 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: Do not apply roofing system during inclement weather or when precipitation is expected.
- 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 is 50 degrees F (10 degrees C) and rising

1.7 WARRANTY

- A. 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.
 - 1. Warranty Period:
 - a. Twenty (20) years
- A. 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. 5 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

Basis of Design: The Garland Company, Inc.; 3800 E. 91st St., Cleveland, OH 44105.

Local representative: Luke Foster, 619-630-9057.

- A. Owner has no responsibility to provide any equipment for handling and / or loading the materials to the Contractor's trucks. Upon signature of receiving the materials, Contractor assumes full responsibility for all received materials. Any materials lost or stolen are the responsibility of the Contractor to replace.
- B. Contractor must provide all labor to install Owner-supplied materials as part of their bid. All materials not specifically included in this section will be the responsibility of the Contractor to provide and install. Contractor to be responsible for all Garland materials in excess of Owner purchased and furnished amount. Owner to provide material quantities matching the specified amount below. Any additional Garland material required to complete this project is the responsibility of the Contractor, including all freight and tax charges.

- C. Maximum quantity of the OFCI materials which will be provided to the Contractor are as follows:

Material	Amount	Unit
LiquiTec Base	135	4.5 Gal
LiquiTec	80	4.5 Gal
Grip Polyester Soft	16	Rolls
Grip Polyester Soft 6"	25	Rolls
StressPly IV Mineral	12	Rolls
KEE-Lock Mastic	10	3 Gal
Tuff-Stuff MS True White	24	Tube
Garla-Prime VOC	5	5 Gal
Garla-Block	3	5 Gal
GarMesh 6"	8	Rolls

2.2 ROOF RESTORATION SYSTEM FOR MINERAL MODIFIED SURFACE ROOFS

- A. LiquiTec System:
1. Base Coating: LiquiTec Base
 2. Top Coating: LiquiTec
 3. Base Flashing Reinforcement: LiquiTec Base & Grip Polyester Soft 6".
 4. Field Reinforcement: Grip Polyester Soft
 5. Repairs: KEE-Lock Mastic, GarMesh 6", StressPly IV Mineral

2.3 LADDER INSTALLATION (ADD-ALTERNATE)

- A. Basis of Design: Alaco Ladder Company, or equal
1. Handrails over Roof Ladder
 - a. Model 561-C

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.
- 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; replace saturated insulation board, replace loose or brittle membrane or membrane flashings. Verify that exiting conditions meet the following requirements:
 - 1. Existing membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
- 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. Clean the entire roof surface by removing all dirt, algae, paint, oil, talc, rust or foreign substance. Use a 10 percent solution of TSP (tri-sodium phosphate), Simple Green and warm water. Scrub heavily soiled areas with a brush. Rinse with fresh water to remove all TSP solution. Allow roof to dry thoroughly before continuing.
- G. Repair existing roof membrane as necessary to provide a sound substrate for the fluid-applied membrane. All surface defects (cracks, blisters, tears) must be repaired using Garla-Prime VOC primer and StressPly IV Mineral torch cap sheet.

3.3 INSTALLATION

- A. General Installation Requirements:
 - 1. Install in accordance with manufacturer's instructions. Apply to minimum coating thickness required by the manufacturer.
 - 2. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.
 - 3. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.
 - 4. Protect work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore work damaged by installation of the roofing system.
 - 5. All primers must be top coated within 24 hours of application. Re-prime if more time passes after priming.
 - 6. Keep roofing materials dry during application.
 - 7. Coordinate counter flashing, cap flashings, expansion joints and similar work with work specified in other Sections under Related Work.
 - 8. 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. Mineral Modified Roof Restoration: Renovation work includes:
 - 1. Surface preparation: Remove dirt, and debris.
 - 2. Metal Flashings: Repair/Replace metal flashings, pitch pockets, etc.
 - 3. Roof Repairs: Repair blisters, holes, cuts, cracks, splits or other surface defects using StressPly IV Mineral. Loose or damaged modified bitumen laps must be resealed/repared using StressPly IV Mineral.
 - 4. Coating Mixing Procedure:
 - a. Mix Part A liquid for one minute using an electric heavy duty power drill and Jiffy mixer blade.
Slowly pour contents of Part B jug, located inside the Part A pail, into the Part A container and mix the two components together for two minutes moving the Jiffy blade from top to bottom and along the sides to ensure the product is thoroughly mixed. Always mix entire kit contents together as packaged. Do not break down into smaller quantities.

5. Application of LiquiTec Base and Reinforcement:
 - a. On field surfaces run fabric reinforcement parallel to the low edge using a shingling method up the slope with minimum 3 inch fabric laps.
 - b. After positioning reinforcement to roll out, apply LiquiTec Base about 40 inches wide to surface where reinforcement ply is to be applied at a rate of 2.0 gallons per 100 SF over granule modified bitumen.
 - c. Use a notched squeegee to spread coating and roller apply with ¾" nap roller to obtain uniform coverage.
 - d. Do not apply coating too far ahead of fabric so coating does not dry before fabric can be embedded.
 - e. Immediately roll Grip Polyester Soft reinforcement into wet coating.
 - f. Ensure roller is fully saturated with coating and backroll over the reinforcement surface to fully saturate.
 - g. Use care to lay the fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.
 - h. Immediately apply an additional coat of LiquiTec Base at the rate of 2.0 gallons per 100 SF over the polyester to fully saturate the polyester.
 - i. Lap adjacent rolls of reinforcement 3 inches and end laps 6 inches.
 - j. Allow to dry, but no more than 72 hours before applying top coat.
6. Application of Top Coat
 - a. Apply top coat of LiquiTec at 2.0 gallon per 100 SF to clean and dry reinforced base coat application.
7. Liquid Flashings:
 - a. All flashings are coated in the same manner as the field prior to field application.
 - b. Vertical liquid flashings shall run a minimum of 4" onto the horizontal surface

3.4 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 asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.5 PROTECTION

- A. As needed, 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.

3.6 FIELD QUALITY CONTROL

- A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system at a minimum of 3 days per week.
- B. Correct defects or irregularities discovered during field inspection.

3.7 FINAL INSPECTION

- A. At completion of roofing installation and associated work, meet with Owner, installer, 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. 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.
- D. Advise Owner upon completion of corrections.
- E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

3.8 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

3.9 SCHEDULES

- A. Base Coating:
 - 1. LiquiTec Base: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 433%
 - b. Tensile Strength, ASTM D 412: 2300 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D522: -60°F (-51.1°C)
 - e. Hardness, ASTM D2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D4073, 274 lbf
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D4073, 150 lbf/in.
 - j. Toughness: 193 ft.-lbf/ft²
 - k. Dry Film Thickness (Fully Reinforced System), 80-88 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D7379, 231 lbf/in.
 - m. Density @ 77° F (25° C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. Flash Point: ASTM D 93, 110°F min. (43°C)
 - o. VOC: 0 g/l
 - p. Microbial Resistance: ASTM G21, No Microbial Growth
- B. Reinforcement
 - 1. Grip Polyester Soft: Strong, elastic polyester reinforcing fabric.
- C. Top Coating:
 - 1. LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 433%
 - b. Tensile Strength, ASTM D 412: 2300 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in

- d. Low Temperature Flexibility, ASTM D522: -60°F (-51.1°C)
- e. Hardness, ASTM D2240 (Shore A): 80
- f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D5635, 37 joules
- g. Static Puncture Resistance (Fully Reinforced System): ASTM D5602, 20 kg
- h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D4073, 274 lbf
- i. Tensile Load Strain (Fully Reinforced System): ASTM D4073, 150 lbf/in.
- j. Toughness: 193 ft.-lbf/ft²
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- l. Lap Shear Strength (MB Seam with coating): ASTM D7379, 231 lbf/in.
- m. Density @ 77° F (25° C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
- n. Flash Point: ASTM D 93, 110°F min. (43°C)
- o. VOC: 0 g/l
- p. Microbial Resistance: ASTM G21, No Microbial Growth
- q. Initial Reflectance: 0.84
- r. Initial Emittance: 0.88
- s. Initial SRI: 105

D. Flashings

- 1. LiquiTec: Multi-purpose, 100% solids, two-part, fast-cure, polyurea liquid waterproofing membrane having the following characteristics:
 - a. Elongation, ASTM D 412: 433%
 - b. Tensile Strength, ASTM D 412: 2300 psi
 - c. Tear Resistance, ASTM D 624: 449 lbs./in
 - d. Low Temperature Flexibility, ASTM D522: -60°F (-51.1°C)
 - e. Hardness, ASTM D2240 (Shore A): 80
 - f. Dynamic Impact Resistance (Fully Reinforced System): ASTM D5635, 37 joules
 - g. Static Puncture Resistance (Fully Reinforced System): ASTM D5602, 20 kg
 - h. Tensile-Tear Resistance (Fully Reinforced System): ASTM D4073, 274 lbf
 - i. Tensile Load Strain (Fully Reinforced System): ASTM D4073, 150 lbf/in.
 - j. Toughness: 193 ft.-lbf/ft²
 - k. Dry Film Thickness (Fully Reinforced System), 80-88 mils
 - l. Lap Shear Strength (MB Seam with coating): ASTM D7379, 231 lbf/in.
 - m. Density @ 77° F (25° C, ASTM D 2939) 9.6 lb./gal (1.2 g/m³)
 - n. Flash Point: ASTM D 93, 110°F min. (43°C)
 - o. VOC: 0 g/l
 - p. Microbial Resistance: ASTM G21, No Microbial Growth
 - q. Initial Reflectance: 0.84
 - r. Initial Emittance: 0.88
 - s. Initial SRI: 105

END OF SECTION