SPF FULL SYSTEM
SILICONE COATED SPRAY FOAM ROOF SYSTEM

Part 1. General Conditions

1.01 Description

A. Scope of Work

Provide all materials, labor and equipment required for the installation of the Silicone Coated Spray Foam Roof including all ancillary products.

B. Related Work

1. Perform Moisture Survey
2. Replace Wet Insulation
3. Repair/Replace All Sheet Metal
4. Surface Preparation
5. Install Spray Foam
6. Install Silicone Membrane
7. Install Walkway Systems

1.02 Performance Requirements

A. Conform to applicable code for fire resistance ratings of roof system.

B. Underwriters Laboratories, Inc. - UL 790: Class A Fire Hazard Classification.

C. Factory Mutual (FM) - FM Standard 4470 approval

D. All silicone products must be domestically produced. Products produced outside of the US will not be accepted.

E. Coating manufacturer must produce its own product. Private labeled silicone coating products will not be accepted.

1.03 Submittals

A. Product Data: Product data on silicone coating, physical and chemical properties, preparation of substrate required, product limitations, and cautionary requirements.

B. Safety Data Sheets (SDS)

C. Shop Drawings: Roof plan and details showing extent of roofing, intersections with adjacent surfaces, and details of expansion joints, counterflashing, and other items for a complete roofing system.

D. Manufacturer's Installation Instructions: Indicate installation requirements and procedures.

E. Certificates:

1. Product certificates signed by the manufacturer certifying material is in compliance with the specified performance characteristics and criteria, and physical requirements.
2. Provide a copy of Certified Licensed Applicator (CLA - SPF) certificate.

F. Sample copy of PM warranty

G. Maintenance Data: For SPF System to include in maintenance manuals.

H. Final Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.04 Quality Assurance

A. Manufacturer:

1. Company specializing in the manufacturing of the system specified in this Section.

B. Installer:

1. Installer must be a Certified Licensed Applicator (CLA - SPF) by the Manufacturer providing the warranty and is capable of receiving the specified warranty.
2. CLA to ensure all personnel are properly trained and have a full understanding of all OSHA safety requirements.

1.05 Delivery, Storage, and Handling

A. Deliver and store liquid materials and other products in their original unopened containers or packaging until ready for installation.

B. Materials shall be clearly labeled with the manufacturer's name, product identification, safety information, and lot numbers.

C. Store materials indoors whenever possible.

D. Protect stored products from freezing.

E. Comply with the manufacturer's instructions for handling and safety procedures.

F. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 Environmental Requirements

A. Maintain logs of environmental conditions (temperature, humidity, and wind speed) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside of manufacturer's limits.

B. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

C. Do not install silicone coating under the following conditions:

1. When ambient temperature is below 35° F.
2. At temperatures less than 5° F above dew point.

1.07 Warranty

A. Provide Manufacturer's (5, 10, 15 or 20 year) labor & material warranty covering leaks due to silicone material failure.

Part 2. Products

2.01 Acceptable Products

A. Spray Foam Insulation

1. Pro Poly HFO 4700

B. Insulation Board

1. Poly Iso: Atlas AC III

C. Cleaners and Primers

1. Progressive Materials: Pro-Prime P-100 General Purpose Primer

D. Silicone Caulk Sealant

1. Progressive Materials: SS 300 Series Silicone Sealant

E. Flashing Grade Sealant

1. Progressive Materials: Pro-Patch FG 400 Silicone Flashing Grade Sealant

F. Reinforcing Fabric

1. Progressive Materials: PF 200 Polyester Fabric
    a. PF 206 - 6"
    b. PF 212 - 12"

G. Walkway System

1. Progressive Materials: Pro-Grip Walkway System
    a. Pro-Grip PG 700 100% Silicone Yellow Walkway Coating
    b. Pro-Grip PG 750 Non-Slip Yellow Walkway Granules

H. Skylight Sealer

1. Progressive Materials: Pro-Seal HS 3220 Clear Silicone Skylight Coating

I. Silicone Coating

1. Progressive Materials: Pro-Poly Sil LS 2200 Series or Pro-Eco Sil HS 3200 Series

2.02 Silicone Coating Materials

A. Silicone base and top coat to be Pro-Poly Sil LS 2200 Series Silicone Coating by Progressive Materials, LLC and complying with the following minimum properties:

1. Tensile Strength: ASTM D412, 551
2. Elongation: ASTM D412, 186 percent minimum at break at 75° F.
3 Water Vapor Permeance: ASTM E-96, 7.9 at 20 mils.
4 Fire resistance: ASTM E108, UL 790 Class A.
5 Color: Owner to select standard topcoat color.
6 Solids Content by Weight: ASTM D-1644, 82% ±2%
7 VoC Content: < 250 grams/liter
8 Initial Solar Reflectivity: .87
9 Initial Thermal Emissivity: .90
10 SRI Value: 110

A. Silicone base and top coat to be Pro-Eco Sil HS 3200 Series Silicone Coating by Progressive Materials, LLC and complying with the following minimum properties:

1. Tensile Strength: ASTM D412, 247
2. Elongation: ASTM D412, 237 percent minimum at break at 75° F.
3. Water Vapor Permeance: ASTM E-96, 10.7 at 20 mils.
4. Fire resistance: ASTM E108, UL 790 Class A.
5. Color: owner to select standard topcoat color.
6. Solids Content by Weight: ASTM D-1644, 92% ±2%
7. VoC Content: < 250 grams/liter
8. Initial Solar Reflectivity: .89
9. Initial Thermal Emissivity: .90
10. SRI Value: 113

2.03 Polyurethane Foam Insulation

2.03.1 Physical property requirements are as follows for acceptable insulation products with Zero-ozone Depleting Potential, and complying with the following properties:

1. Density: sprayed-in-place, pcf, min. 2.7-3.2, ASTM D-1622
2. Compressive Strength: 50 psi, ASTM D-1621
3. Closed-Cell Content: percent, min. >90, ASTM D-2856
4. K-factor: 0.158, ASTM C-518
5. Dimensional Stability: <6%, ASTM D-2126
6. Flame Spread: max. 10 ASTM E-84

Part 3. Execution

3.01 Examination

A. Verify roof slope prior to beginning installation. There is to be no single area of standing water on the roof 24 hours after a rain, greater than 100 sq. ft. and more than ½" deep.

B. Inspect all roof drains to ensure proper performance.

C. Verify that all roof penetrations and flashings are properly installed and secured.

3.02 Preparation

A. General Roof Preparation

1. Clean surfaces thoroughly prior to installation.
2. Prepare surfaces using methods recommended by manufacturer for achieving the best result for the substrate under project conditions indicated.
3. Roof Board Insulation: Prevent materials from getting wet.
4. Schedule work after penetrations through roof are complete and perimeter conditions are ready to receive roof system.
5. Comply with SPFA applicable guidelines.
6. Prevent materials from entering and clogging roof drains and from migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecasted.

B. Concrete Deck (if applicable)

1. Fill surface honeycombs and variations with latex filler.
2. Remove materials or substances that will interfere with total adhesion of foam insulation to substrate.
3. Mask off adjacent surfaces that are not scheduled to receive foam.

C. Recovery Board (if applicable)

1. Install cover board with fasteners recommended by roofing system manufacturer to achieve wind uplift requirements specified for roofing system.
2. Ensure boards fit firmly together along all edges without gaps or openings.

3. Protect cover board from getting wet after installation and prior to being protected by foam. Cover board that has been exposed to moisture must be replaced.

4. Remove loose dirt and debris by using compressed air, vacuum or light brooming.

5. Protect installed cover board from spills of contaminants such as oil, grease, solvents, etc. Replace cover board that has been exposed to such contaminants.

6. Remove materials or substances that will interfere with total adhesion of foam insulation to substrate.

7. Mask off adjacent surfaces that are not scheduled to receive foam.

D. Built-up Roof (if applicable)

1. Remove any existing wet material in the roof system.

2. Hydro-vac all loose gravel from roof surface.

3. Mechanically attach existing built-up roof to meet wind uplift requirements.

4. Mask off adjacent surfaces that are not scheduled to receive foam.

E. Existing Spray Polyurethane Foam and Coating (if applicable)

1. Scarify the existing Spray Polyurethane Foam and Coating down to a clean, dry and workable surface.

2. Scarified foam to receive a minimum ½ inch pass of new Polyurethane Foam to ensure smooth surface.

3. Clean the remaining surface to be free of dust and debris.

4. Mask off adjacent surfaces that are not scheduled to receive foam.

5. Prime the surface of the scarified foam with Pro-Prime P-100 primer at a rate of ½ gallon per 100 square feet.

3.03 Polyurethane Foam Application

A. Inspection

1. Prior to polyurethane foam application, inspect the substrate surface to ensure preparations required in Section 3.02 have been met.

B. Application

1. All objects that require protection from overspray shall be protected; all movable objects shall be moved to an acceptable area. All intake air vents shall be turned off and covered.

2. Apply the polyurethane foam in strict accordance with the polyurethane foam manufacturer's specifications and application instructions, using spray equipment recommended by the polyurethane foam manufacturer. The field of the roof shall be applied, as practical, by a digitally controlled robotic SPF application device. The robotic method shall improve consistency, slope-to-drain, and visual appearance.

3. Polyurethane foam shall be applied in a minimum of ½-inch thick passes. The total thickness of the new polyurethane foam shall be a minimum of 1.5 inches, except where tapering is required to facilitate drainage or areas removed are brought to the existing roof level.

4. Apply the full thickness of polyurethane foam in any area on the same day.

5. Polyurethane foam shall be applied to ensure proper drainage, resulting in no ponding water.

Ponding water is defined as "an area of 100 square feet or more which holds in excess of ½ inch of water as measured 24 hours after rainfall."

6. The polyurethane foam shall be terminated neatly a minimum of 4 inches above the finished roof surface at roof penetrations. Foamed-in-place cants shall be applied to allow a smooth transition from the horizontal to vertical surface.

7. The finished polyurethane foam surface texture shall be "smooth to orange-peel", free of voids, pinholes and depressions. "Verge of popcorn" texture is acceptable if it can be thoroughly and completely coated. Popcorn and tree bark textures are not acceptable. Unacceptable foam textures shall be removed and re-foamed prior to coating application.

3.04 Silicone Roof Coating Application

A. Inspection

1. Prior to the application of silicone coating, inspect the polyurethane foam surface to ensure the conditions of Section 3.03 have been met.

2. The polyurethane foam surface shall be free of moisture, dust, dirt, debris and other contaminants that would impair the adhesion of the silicone coating.

3. If more than 24 hours elapse between the polyurethane foam application and the start of the silicone coating application, thoroughly inspect the polyurethane foam surface for UV degradation and oxidation. Call PM Technical Department for procedures to proceed if UV damage has affected the foam.

B. Application

1. Pro-Poly Sil LS 2204 or Pro-Eco Sil HS 3204 Silicone Roof Coating, dark gray should be used as the basecoat on new polyurethane foam.
2. The silicone basecoat shall be applied on the same day as the polyurethane foam application, after the polyurethane foam has been allowed to cure a minimum of one hour.

3. Apply the basecoat in a uniform application to achieve a finished dry film thickness of approximately ½ the total millage required for the roof.

4. The basecoat shall not be subjected to foot traffic or otherwise disturbed until it is tack-free.

5. After it has cured, inspect the coating for pinholes, cracks, thin areas or other defects. All defects observed shall be caulked with sealant and/or roller coated with additional basecoat prior to applying subsequent coats of silicone.

6. The basecoat must be cured, clean and free of all moisture prior to application of topcoat.

7. Apply the topcoat in a contrasting color to the basecoat. The topcoat application shall be made at right angles to the basecoat application. Surface texture and conditions may require additional quantities of silicone to ensure proper millage. It is the contractor's responsibility to properly coat the insulation regardless of the quantity of silicone coating required.

8. The Silicone Roof Coating shall be applied a minimum of 2 inches beyond all the terminated edges of the polyurethane foam. These terminations should be masked to provide a straight edge, neat, finished appearance.

9. Allow the topcoat to cure and inspect the finished coating surface for pinholes, cracks, thin areas, or other defects. Repair any defects observed with silicone sealant and/or additional silicone coating material.

10. It is the applicator's responsibility to ensure the minimum total dry film thickness specified by the warranty term chosen is achieved throughout the entire roof area regardless of the quantity of liquid silicone required.

11. Minimum required total coating thicknesses are as follows:
    a. 5 Year Warranty - 14 dry mils (1 Gallons Per Square)
    b. 10 Year Warranty - 20 dry mils (1.5 Gallons Per Square)
    c. 15 Year Warranty – 28 dry mils (2 Gallons Per Square)
    d. 20 Year Warranty – 35 dry mils (2.5 Gallons Per Square)
12. Minimum required coating thickness for Pro-Poly Sil LS 2200 Series are as follows:
    a. 5 Year Warranty, 13 dry mils new coating (1 Gallons Per Square)
    b. 10 Year Warranty, 20 dry mils new coating (1.5 Gallons Per Square)
    c. 15 Year Warranty, 26 dry mils new coating (2 Gallons Per Square)
    e. 20 Year Warranty, 33 dry mils new coating (2.5 Gallons Per Square)

3.05 Granule/Aggregate Application

A. Application

1. Apply roofing granules in a finish coat of silicone coating. A minimum of 10 dry mils of silicone coating is required to hold the granules.

2. Apply the roofing granules, using suitable compressed air equipment, uniformly at a rate of approximately 30-40 pounds per 100 square feet of roof area.

3. Apply the roofing granules immediately after the topcoat application to obtain maximum wet-out and embedment.

4. Bare spots in the granulated surface shall be filled in by applying additional coating and granules in these areas.

3.06 Walkway System

A. Install the Pro-Grip Walkway System at heavy traffic areas and at high impact areas as directed by the owner.
1. Walkway Areas
    a. Walkways should be a minimum of 30" wide.
    b. Mask off area to receive walkway system to ensure clean straight edges.
    c. Install Pro-Grip PG 700 100% Silicone Yellow Walkway Coating at a thickness of 25 mils.
    d. Immediately after the application of the Pro-Grip PG 700 coating, broadcast Pro-Grip PG 750 Pro-Grip Non-Slip Granules into the coating at a rate of 40 lbs. per 100 square feet. The granules will settle into the coating. Apply the granules generously, inspect the surface within a few minutes and reapply as needed to obtain a continuous film of granules.
2. High Impact Areas (around mechanical equipment, etc)
    a. Mask off area to receive walkway system to ensure clean straight edges. Area should be 30" wide around all identified equipment.
    b. Install Pro-Grip PG 700 100% Silicone Yellow Walkway coating at a thickness of 40 mils.
    c. Immediately after the application of the Pro-Grip PG 700 coating, broadcast Pro-Grip PG 750 Non-Slip Walkway Granules into the coating at a rate of 60 lbs. per 100 square feet. The granules will settle into the coating. Apply the granules generously, inspect the surface within a few minutes and reapply as needed to obtain a continuous film of granules.

B. After the coating has completely cured, remove all loose granules with a small hand blower and a soft bristle broom.

3.07 Field Quality Control

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation upon completion and submit report to owner/Architect. There shall be no items on the roof that could inhibit the inspection process, such as, solar panels, decking systems, etc.

1. Notify owner 48 hours in advance of date and time of inspection.

    a. Repair or remove and replace components of roofing system where inspection results indicate that they do not comply with specified requirements.

3.08 Protection of Finished Work

A. Ensure roof surface is free of traffic for minimum of 12 hours after silicone coating application or until coating is completely cured.

B. Ensure any subsequent work does not cause damage to finished roof system. If necessary, install protection over finished roof area.

END OF SECTION