

Fully Reinforced Silicone Roof System

Part 1. General Conditions

1.1 Description

A. Scope of Work

Provide all materials, labor and equipment required for the installation of the new Fully Reinforced Roof System.

B. Related Work

1. Repair All Sheet Metal Defects
2. Install Polyiso Cover Board
3. Install DensDeck Roof Board
4. Perform Adhesion Tests
5. Install Silicone RCR Membrane and Polyester Fleece Fabric
6. Install Walkway Systems

1.2 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. All silicone products must be domestically produced. Products produced outside of the US will not be accepted.
- D. Coating manufacturer must produce its own product. Private labeled silicone coating products will not be accepted.
- E. The RCR silicone coatings discussed in this specification have a moderate rate of water vapor transmission. They are not recommended for use on cold storage or cryogenic structures. Such structures may have constant high water vapor drive causing long-term accumulation of moisture in the insulation/deck. Consult manufacturer for vapor retardant systems to use on refrigerated structures

1.3 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.
- F. Sample copy of PM warranty

- G. Maintenance Data: For Fully Reinforced Roof System to include in maintenance manuals.
- H. Final Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.4 Quality Assurance

- A. Manufacturer:
 - 1. Company specializing in the manufacturing of the system specified in this Section.
 - 2. A minimum of 10,000,000 square feet of a similar system installed.
- B. Installer:
 - 1. Installer must be a Certified Licensed Applicator (CLA) by the Manufacturer providing the warranty, and 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.
- C. Manufacturer Field Representative: Provide a qualified representative of the Manufacturer providing the warranty to monitor and periodically inspect the installation.

1.5 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.

1.6 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.

1.7 Warranty

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

Part 2. Products

2.1 Acceptable Products

- A. Polyiso cover board

- B. DensDeck Roof Board
- C. Cleaners and Primers
 - 1. Progressive Materials: Consult PM Primer Guide
- D. Silicone Caulk Sealant
 - 1. Progressive Materials: SS 300 Series Silicone Sealant
- E. Flashing Grade Sealant
 - 1. Progressive Materials: FG 400 Pro Patch
- F. Reinforcing Fabric
 - 1. Progressive Materials: PF 200 Polyester Fabric
 - a. PF 206 – 6"
 - b. PF 212 – 12"
 - c. PF 236 – 36"
- G. Walkway System
 - 1. Progressive Materials: Pro-Grip Walkway System
 - a. PG 700 Pro-Grip Yellow Walkway Coating
 - b. PG 750 Pro-Grip Yellow Walkway Granules
- H. Skylight Sealer
 - 1. Progressive Materials: HS 3220 Clear Silicone Skylight Coating
- I. Silicone Coating
 - 1. PS 900 Silicone base & intermediate coat

2.2 Silicone Top Coat

- A. Silicone base and top coat to be Pro-EcoSil 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 D-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: 92% ±3%
 - 7. VOC Content: < 50 grams/liter
 - 8. Initial Solar Reflectivity: .89
 - 9. Initial Thermal Emissivity: .90
 - 10. SRI Value: 113

Part 3. Execution

3.1 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. Identify all deck failures, and inadequate sheet metal details.

- C. Inspect all roof drains to ensure proper performance.
- D. For applications over newly poured concrete, the roof must be fully cured for a minimum of 60 days prior to coating application.
 - 1. DensDeck Roof Board is not required for applications over concrete.
 - 2. Applications over un-aged concrete (less than a year old) do require P-140 2-Part Epoxy Primer to promote adhesion.

3.2 Preparation

A. Concrete

1. Cleaning

- a. Thoroughly power wash roof surface and all other areas to receive new coating with a minimum of 2,000 psi water pressure.
- b. After the surface has fully dried, install P-140 two-part epoxy primer at a rate determined in the Technical Product Data sheet, under “coverage guide”.
- c. Any areas of grease contamination are to be cleaned with an industrial strength detergent.
- d. Any loose roofing or mastic materials must be removed.

2. Roof Penetration and Flashing Details

- a. Ensure all roof penetrations and flashings provide a watertight condition. Re-flash all areas with one of the following methods:
 - 1) Install FT 500 Butyl Fleece Tape. Apply 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over Fleece Tape.
 - 2) Install Pro-Patch FG 400 Flashing Grade Silicone Sealant.

3. Sheet Metal

- a. Ensure all sheet metal accessories are in good condition and will provide a watertight condition. If necessary, replace or repair any sheet metal required to provide a watertight condition.

4. Roof Parapets

- a. Seal all roof parapet seams with one of the following methods:
 - 1) Apply Pro-Patch FG 400 Flashing Grade Silicone Sealant onto parapets using a stiff-bristled paint brush or putty knife.
 - 2) A three-course coating-fabric-coating by applying one coat of Pro-Eco Sil HS 3200 at 1.75 gallons per square, embed PF 200 Polyester Fabric into wet coating, then apply another coat of Pro-Eco Sil HS 3200 at 1.75 gallons per square.
 - PF 200 Polyester Fabric should extend a minimum of 8” up parapet to ensure proper watertight condition.

5. Cracks and Seams

- a. For stress cracks smaller than ¼”, apply a heavy coat of Pro-Patch FG 400 Silicone Sealant in the crack and 1” on each side of it. Allow coating to dry for 2-4 hours before installing base coat.
- b. For stress cracks or expansion joints larger than ¼”, insert backer rod into the crack, then, apply a heavy coat of Pro-Patch FG 400 over the crack and 1” on each side of it. Ensure the backer rod is completely encapsulated. Allow the Pro-Patch FG 400 to dry for 24 hours prior to installing basecoat.

B. EPDM

1. Membrane Cleaning:

- a. Apply Pro-Prime P-120 EPDM Rinseable Primer at a rate of 400 sq ft per gallon, let material stand for 15 minutes and then rinse off.
- b. Thoroughly power wash roof surface and all other areas to receive new coating with a minimum of 2,000 psi water pressure. Be sure not to damage existing membrane during this process.

- c. After the surface has dried, perform an adhesion test. If the coating does not properly adhere to the surface, repeat steps 1 and 2 above.
 - d. Any areas of grease contamination are to be cleaned with an industrial strength detergent.
 2. Flashings Details: Ensure all existing flashings provide a watertight condition. If necessary, re-flash any areas required utilizing 4" FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape.
 3. Membrane Seams: Repair all seam failures utilizing 4" FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape. **NOTE: On 15 or 20 year warranties, FT 500 Butyl Fleece Tape must be installed on all membrane seams.**
 4. Sheet Metal: Ensure all sheet metal is in good condition and will provide a watertight condition. If necessary, replace or repair any sheet metal required.
 5. Fastener Back Out: Identify and replace all fasteners that are loose or backed out. Repair membrane cuts utilizing FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape.
- C. Gravel Surface BUR
 1. Roof Cleaning:
 - a. Remove all loose stone by power broom or vacuum.
 - b. Thoroughly power wash roof surface and all other areas to receive new coating with a minimum of 2,000 psi water pressure. Be sure not to damage existing membrane during this process or clog any roof drainage. Roof may also be cleaned by high pressure wet-vac process instead of power washing.
 - c. Any areas of grease contamination are to be cleaned with an industrial strength detergent. **NOTE: Be certain to confirm that removing the loose rock will not diminish the wind uplift rating of the current roof system.**
 2. Flashings Details: Ensure all existing flashings provide a watertight condition. If necessary, re-flash any areas required utilizing a 3-course coating fabric detail as outlined above or utilizing FG400 Flashing Grade Silicone.
 3. Sheet Metal: Ensure all sheet metal is in good condition and will provide a watertight condition. If necessary, replace or repair any sheet metal required.
 4. Primer: Spray apply P160 Asphalt Bleed Blocker over entire roof area and flashings at a rate of 1 gallon per square. Be certain to allow the primer to fully cure prior to installing any additional coatings.
 5. Surface Leveling: Upon completion of all repairs outlined above, spray apply the surface leveling coating SL 800 at a rate of 3 to 6 gallons per square, depending on surface texture. After the leveling coating is installed, there should be no rock protruding greater than ¼" maximum out of the coating. Allow the coating to fully cure for 1 to 2 days depending on environmental conditions.
 6. NOTES: This system should not be installed over coal tar pitch. All materials should be spray applied to prevent dislodging existing embedded gravel.
- D. Modified Bitumen or Smooth Surface Built-Up
 1. Membrane Cleaning:
 - a. Thoroughly power wash roof surface and all other areas to receive new coating with a minimum of 2,000 psi water pressure. Be sure not to damage existing membrane during this process.
 - b. After the surface has dried, perform an adhesion test. If the coating does not properly adhere to the surface or to prevent bleed through, apply Pro-Prime P-160 Asphalt Bleed Blocker at a rate of 1 gallon per square.
 - c. Any areas of grease contamination are to be cleaned with an industrial strength detergent.

2. Flashings Details: Ensure all existing flashings provide a watertight condition. If necessary, re-flash any areas required utilizing a 3-course coating fabric detail as outlined above.
 3. Lap Seam Treatment:
 - a. Identify and repair all lap seam failures utilizing a 3-course coating fabric detail as outlined above.
 - b. To ensure complete encapsulation of the lap seams, install 20 mils (app. 2" wide) of Pro-Eco Sil HS 3200 Silicone Coating over all lap seams prior to coating the field of the roof. Coverage rate to be approximately 100 lf. per gallon.
 4. Sheet Metal: Ensure all sheet metal is in good condition and will provide a watertight condition. If necessary, replace or repair any sheet metal required.
 5. Primer: Pro-Prime P-160 Asphalt Bleed Blocker over entire roof area and flashings at a rate of 1 gallon per square.
- E. PVC, TPO, Hypalon
1. Membrane Cleaning:
 - a. Thoroughly power wash roof surface and all other areas to receive new coating with a minimum of 2,000 psi water pressure. Be sure not to damage existing membrane during this process.
 - b. After the surface has dried, perform an adhesion test. If the coating does not properly adhere to the surface, apply Pro-Prime P-151 Single Ply Primer at a rate of 1/3 gallon per 100 square feet.
 - c. Any areas of grease contamination are to be cleaned with an industrial strength detergent.
 - d. Flashings Details: Ensure all existing flashings provide a watertight condition. If necessary, re-flash any areas required utilizing 4" FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape.
 - e. Membrane Seams: Repair all seam failures utilizing 4" FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape.
 - f. Sheet Metal: Ensure all sheet metal is in good condition and will provide a watertight condition. If necessary, replace or repair any sheet metal required.
 - g. Fastener Back Out: Identify and replace all fasteners that are loose or backed out. Repair membrane cuts utilizing FT 500 Butyl Fleece Tape and install 25 mils of Pro-Eco Sil HS 3200 Silicone Coating over tape.

Wet Insulation Remediation

- A. Existing Wet Insulation Areas:
1. Roof areas containing moisture below the roof surface shall either be replaced, or for areas less than 500 sq. ft. with moderate moisture content, a moisture relief vent shall be installed.
 2. Wet Insulation Replacement (wet area is greater than 500 sq. ft.)
 - a. Cut three sides of membrane and fold back to expose wet insulation.
 - b. Remove and replace insulation with identical insulation materials. Fasten new insulation at a rate of 1 fastener per 2 square feet.
 - c. Fold original membrane back over top of the new insulation.
 - 1) Membrane cuts are to be fastened with barbed membrane seam fasteners staggered 6" o.c.
 - 2) Install 20 mils of HS 3200 coating approximately 16" wide centered over membrane cuts.
 - 3) Install 12" wide PF 212 Polyester Fabric into the wet coating. Smooth out fabric and ensure there are no wrinkles or fish mouths.
 - 4) Install another coat of HS 3200 at a rate of approximately 20 mils over new fabric.
 3. Moisture Relief Vent Installation (wet area is less than 500 sq. ft.)

- a. Locate center of moisture-containing insulation.
- b. Cut a 4" diameter opening through the coating, membrane and insulation material; remove material to vapor barrier or deck.
- c. Lay the MRV 600 Roof Vent on top of roof system and attach vent to the roof deck with the appropriate fastener. Install 4 fasteners per vent, evenly spaced.
- d. Clean area of vent that is to receive flashing material with clean rag and solvent to remove oil film from vent.
- e. Flash in vent with one of the two following procedures:
 - 1) Apply a 3-course coating and fabric utilizing the PF 200 Polyester Fabric and HS 3200 Silicone Coating.
 - 1) Apply 12 to 15 mils of silicone coating over surface to receive fabric.
 - 2) Embed fabric into silicone coating while still wet. Fabric should extend at least 2" on to the flange of the vent and at least 4" on to the roof surface.
 - 3) After the base coating has cured, apply a generous coat of silicone coating over the fabric to ensure complete saturation.

3.3 Reinforced Silicone Coating Installation

- A. Ensure surface is completely dry.
- B. Ensure subsequent coats of primer or silicone coating is completely cured.
- C. Ensure adhesion tests have been completed and results are satisfactory with the manufacturers requirements.
- D. Install PS 900 Pro-Shield Max Base coat at a rate of 2.0 to 2.25 gallons per square (depending on surface texture). While coating is still wet, embed Polyester Fleece 36" fabric. Use a nap roller to smooth out fabric to ensure there are no wrinkles or fish mouths. Note: each roll of fabric should overlap the previous roll by 3".
- E. Install an additional 1.5 gallons per square overtop of the Polyester Fleece fabric.

- F. Install HS 3200 silicone coating over entire roof surface at a thickness of:
 1. 15 mils minimum for a 5 year warranty
 2. 20 mils minimum for a 10 year warranty
 3. 25 mils minimum for a 15 year warranty
 4. 30 mils minimum for a 20 year warranty
- G. Care should be taken to ensure proper coverage on all vertical surfaces which could take multiple coats.

- H. NOTE
 1. Any subsequent roof repairs after the coating installation should be done only with silicone products. Repairs should be completed with a three-course coating and fabric if needed.

3.4 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 PG 700 Pro-Grip Yellow Walkway Coating at a thickness of 25 mils.
 - d. Immediately after the application of the PG 700, broadcast PG 750 Pro-Grip Walkway 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 PG 700 Pro-Grip Yellow Walkway Coating at a thickness of 40 mils.
 - c. Immediately after the application of the PG 700, broadcast PG 750 Pro-Grip 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.

3.5 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, paver 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.

3.6 Cleaning

- A. Remove overspray from adjacent surfaces using cleaning agents and procedures recommended by manufacturer of affected construction.
- B. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their instructions.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.7 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