Section 07560 Fluid-Applied Roofing

Built-up Roof Preservation System with Silicone Master Guide Specification

1 *PART 1 – GENERAL*

1.1 RELATED WORK SPECIFIED ELSEWHERE

A. Rough Carpentry: Section 06100

B. Board-Stock Roof Insulation: Section 07220

C. Flashing & Sheet Metal: Section 07620

D. Roof Accessories: Section 07800

E. Prefabricated Expansion Joints: Section 07860

F. Painting: Section 09900

1.2 QUALITY ASSURANCE

A. Qualifications of Contractor

(1) The Contractor shall be acceptable to the Primary Coating Materials Manufacturer for application of its roof coatings products, and shall have a minimum of three (3) years experience in the application of elastomeric roof coatings.

(2) The Contractor shall provide a list of project references similar in nature to the one proposed, including contact names and telephone numbers.

B. Qualifications of Manufacturer

(1) Manufacturer of the fluid applied elastomeric coating system shall have a proven track record of successful installations of elastomeric technology.

(2) Other Manufacturer's products shall be accepted for use on this project only after submittal of product data files to the Architect or Owner supporting quality, equality and full compliance with specifications herein. The Architect or Owner reserves the right to reject the substitution proposals should it be determined the submittals do not provide all functions required for application.

(3) Manufacturer to be certified ISO 9001:2008

C. Testing and Labeling

(1) The coating system to be U.L. Classified tested in compliance to UL790 Class A fluid-applied system for maintenance and repair of existing Class A, B or C roofing constructions. Products to be subject to Underwriters Laboratory Follow-up Services.

(2) The silicone coating to be FM Global Approved and listed as an acceptable recoating system over existing roof substrates.

(3) The silicone coating to be approved by Miami-Dade County Building Code Compliance with as active Notice of Acceptance (NOA).

(4) The Manufacturer shall also provide recognized, third party independent test results confirming the coating system's conformance to ASTM D6694.

(5) Individual container labels must include the following information or they will be rejected at the jobsite: Manufacturer's name, product name, type and class of material, all

applicable Code and Testing approval logos, batch or lot number, mixing and application instructions, and precautions.

1.3 SUBMITTALS

A. Submit Manufacturer's literature, certificates and samples in a single package to the Architect or Owner in accordance with requirements specified in General Conditions.

B. Manufacturer's Literature: Literature on the protective coating, as well as related primers, sealants, reinforcement, etc., shall be submitted for review before work is started. Literature shall show material specifications, physical properties (including ASTM test methods utilized), and manufacturer's estimated application rate for required dry mil thickness per warranty requirements, current application instructions and SDS.

C. Applicator's Qualifications: Submit a copy of manufacturer's registration or certification as issued by the Manufacturer.

D. Warranty: Submit a copy of Primary Coating Materials Manufacturer's warranty to comply with project requirements.

1.4 PRODUCT DELIVERY, STORAGE & HANDLING

A. Delivery of Materials: Materials shall be delivered to the jobsite in Manufacturer's original, sealed containers with labels legible and intact.

B. Storage of Materials: Materials shall be stored in an area specifically designated for that purpose, in accordance with Manufacturer's recommendations, where temperatures will not be less than 50°F (10°C) or higher than 100°F (38°C).

C. Material Handling: Materials shall be handled, stored and installed per Manufacturer's instructions and all applicable safety regulatory agencies.

D. Damaged Materials: Contaminated, damaged or unsealed materials, or materials not conforming to the specified requirements shall not be used in the installation. Rejected containers shall be immediately removed from the jobsite and replaced at no additional cost to the Owner.

1.5 ENVIRONMENTAL CONDITIONS

A. Install all materials in strict accordance with Manufacturer's published safety, weather and temperature precautions.

B. Do not apply elastomeric coating system components when the ambient and/or surface temperature is below 50°F (10°C) or above 110°F (43°C), if surface moisture is present, when the dew point is within 5°F (3°C) of the surface temperature or when there is a possibility of temperatures falling below 32°F (0°C) within a 24 hour period. Do not apply if weather conditions will not permit complete cure before rain, dew, fog or freezing temperatures occur. Do not spray apply if the wind velocity exceeds 10 mph (16 kph) without taking precautions to eliminate overspray.

C. Take all measures necessary to protect unrelated work and other adjacent surfaces from coating overspray or spillage.

1.6 FIELD QUALITY CONTROL

A. The overall weather conditions, including surface temperature, surface moisture, ambient temperature, relative humidity and wind velocity shall be recorded by the Contractor, at designated time intervals, on the Daily Quality Control Report form if so requested by the Architect or Owner.

B. Verification of Protective Coating Thickness: During application of the elastomeric coating, the wet film thickness shall be measured and recorded daily, along with the quantity and batch numbers of the material applied and total square feet coated, on the Daily Quality Control form.

1.7 WARRANTY

A. 10-Year System Warranty

B. 15-Year System Warranty

C. 20-Year System Warranty

2 *PART 2 – PRODUCTS*

2.1 DESCRIPTION: A seamless, fluid applied membrane system designed for application over Built-up Roof substrates. Approved system shall be KM Coatings Silicone Coating Systems for Built-up Roofs.

2.2 MATERIALS

A. Construction Grade Sealant: single package polyurethane sealant as approved by Coating Manufacturer for use on termination bars and counterflashing.

B. Primer: KM Epoxy Primer, a two component, 1 to 1 ratio, water-based epoxy primer

Test Property	Test Value	Test Procedure
Weight/gal. (As mixed A+B) (lb.)	11.7	ASTM D 2939
Solids Weight (%)	60% $\pm$ 2	ASTM D 1644
Solids Volume (%)	42.5% $\pm$ 2	ASTM D 2697
Temperature Limit for normal Service (^{o}F)	-40 to 180	
VOC	<55 g/l	Std. method
Flash Point ^{o}F	212	PMCC

C. Viscosity Modifying Reinforcement Material: KM 40/40 Fibers, a high-tensile polyethylene fiber for use in the field by the applicator to modify thickness, enhance sag resistance and for use in high build application when utilized with KM silicone roof coatings.

D. Reinforcement Fabric: Stitch bonded polyester fabric, KM Reinforcing Polyester for reinforcing seams, flashing, and large detail areas.

Test Property	Test Value	Test Procedure
Thickness (in.)	0.018	ASTM D 1777
Tensile Strength	MD: 67 lbs. CD: 59 lbs.	ASTM D5034
Trapezoid Tear	MD: 22 lbs. CD: 21 lbs.	ASTM D 5587

E. Fluid Applied Elastomeric Products:

(1) Silicone Roof Coating: PS #220 95 single component, solvent borne, moisture cure silicone roof coating:

Test Property	Test Value	Test Procedure
Accelerated Weathering @ 8760 hr.	Pass	ASTM G53
Permeance (perms)	5.9	ASTM E 96 (procedure B)
Elongation (%)	250 $\pm$ 25	ASTM D 2370

Tensile Strength (psi)	475 ± 25	ASTM D 2370
Hardness (Shore A)	50 ± 5	ASTM D 2240
Viscosity – spray grade / bulk (cP)	5,000 – 8,000	Brookfield© 4d/5 rpm @ 77ºF
Viscosity – roller grade / pail (cP)	8,000 – 12,000	Brookfield© 4d/5 rpm @ 77ºF
Weight per gallon (lb)	10.2	ASTM D 2939
Solids Weight (%)	80 ± 2	ASTM D 1644
Solids Volume (%)	69 ± 2	ASTM D 2697
Solar Reflective Index – initial (white)	106	
Reflectivity – initial (white)	85	ASTM C 1549
Emissivity – initial (white)	85	ASTM C 1371
Temperature Stability Range (ºF)	-80 to 350	
Tack-free time (hrs. subject to temp./humidity)	1-4	ASTM D 3960
VOC (gm/l)	< 250	Std. Method
Flash Point (ºF)	105	PMCC

(2) Silicone Roof Coating: PS #250 is a premium grade, high solids, single component, moisture cure silicone roof coating:

Test Property	**Test Value**	**Test Procedure**
Accelerated Weathering @ 5,000 hr.	Pass	ASTM 6694
Permeance (perms)	5.9	ASTM E 96 (procedure B)
Elongation (%)	250 ± 25	ASTM D 2370
Tensile Strength (psi)	375 ± 25	ASTM D 2370
Hardness (Shore A)	50 ± 5	ASTM D 2240
Viscosity – spray grade / bulk (cP)	5,000 – 8,000	Brookfield© 4d/5 rpm @ 77ºF
Viscosity – roller grade / pail (cP)	8,000 – 12,000	Brookfield© 4d/5 rpm @ 77ºF
Weight per gallon (lb)	10.8	ASTM D 2939
Solids Weight (%)	96 ± 2	ASTM D 1644
Solids Volume (%)	96 ± 2	ASTM D 2697
Solar Reflective Index – initial (white)	110	
Reflectivity – initial (white)	87	ASTM C 1549
Emissivity – initial (white)	89	ASTM C 1371
Temperature Stability Range (ºF)	-80 to 350	
Tack-free time (hrs. subject to temp./humidity)	1-4	ASTM D 3960
VOC (gm/l)	< 50	Std. Method
Flash Point (ºF)	290	PMCC

3 *PART 3 – EXECUTION*

3.1 SURFACE INSPECTION: Inspect all roof surfaces to receive work specified under this section to ensure that the following conditions exist:

A. Roof surfaces shall be clean, dry, and structurally sound, stable and well secured.

B. KM silicone coatings are not affected by ponding water. However, the NRCA (National Roofing Contractors Association.) considers ponding water undesirable and recommends that all roof assemblies have positive drainage. KM Coatings recommends adherence to the NRCA guidelines.

C. Inspect condition of flashing details adjacent to protrusions, penetrations, roof mounted equipment, curbs, walls, parapets, drains and roof edge to ensure that details are acceptable and will maintain a weather-tight installation after being properly detailed and coated.

D. All laps must be probed and if found to be deficient, repaired.

E. **Recommended Option:** Determine moisture content of existing substrate, insulation and deck. If excessive moisture is found, work shall not proceed until the cause of the moisture is verified and the condition is corrected.

3.2 SURFACE PREPARATION

A. All surfaces shall be clean and dry, and free of any dirt, dust, gravel, oil, surface chemicals or other contaminants that may interfere with optimum adhesion.

B. Any unsound areas in the roof deck or insulation, including blisters, delamination, deterioration, excessive moisture content, etc., shall be repaired or replaced.

C. Remove heavy deposits of dirt, leaves, pine needles and other debris using a broom or air blower. Any rocks, branches or other large foreign objects should also be removed.

D. Power wash the roof with clean water using a minimum 2,000 psi (13,790 kPa) pressure washer. Begin the power rinse at the lowest point on the roof and work upwards, keeping the pressure washer tip within 12" (30 cm) of the roof surface. Once the highest point of the roof is reached, work down again with a final rinse to remove any excess mica from the roof surface. On flat roofs, work away from and then towards the roof drains so that surfaces receive a double rinse.

E. After cleaning, allow roof surfaces to dry thoroughly prior to application of the fluid applied coatings**.** In some cases, additional cleaning may be necessary.

F. Tighten or re-secure all terminations, and caulk termination bars and counterflashing.

G. Apply base coat of KM Epoxy Primer at a minimum rate of 100-150 square feet per gallon. Color: Gray. If primer is left exposed for over 36 hours, re-prime the roof's surface.

H. Repair all loose, torn or open laps in the built-up roof membrane using KM silicone roof coating and KM Polyester Fabric.

I. **Recommended Option:** Adhesion Test, one (1) test every 10,000 sq. ft.

(1) Procedure: In accordance with ASTM D 903

(a) Clean area at least 12 inches by 12 inches

(b) Prime area and permit to cure

(c) Coat area at specified rate

(d) While coating is still wet, embed 2-inch wide polyester fabric across test patch leaving 6-inch long dry section outside of test patch.

(e) Apply second coat to totally encapsulate flashing fabric and allow to cure for 14 days minimum.

(f) Pull dry end of flashing fabric at 180 degree angle with calibrated scale to failure of adhesion.

(2) Passing criteria: four (4) pounds minimum resistance prior to failure.

(a) If adhesion test fails, additional cleaning and/or priming may be required.

J. If necessary, all seams can be reinforced KM Polyester Fabric and silicone roof coating. KM Polyester Fabric must be over-coated before end of workday. Minimum width of fabric over seams to be six (6) inches.

K. Repair any tears, breaks, holes (including those from fastener relocation or protruding fasteners), or other openings in the roof membrane using silicone roof coating and KM Polyester Fabric. All seams must be reinforced KM Polyester Fabric and silicone roof coating. Installed KM Polyester Fabric must be over-coated before end of workday.

L. Reinforce detail areas, around the base of all vents, stacks, fans and other protrusions, around all drains and scuppers, and around the base of all HVAC units and other roof-mounted equipment using KM Polyester Fabric and silicone roof coating or silicone roof coating modified KM 40/40 Fibers. Installed KM Polyester Fabric must be over-coated before end of workday. All flashing reinforcement to cover entire flashing surface and must extend a minimum of three (3) inches onto the horizontal roof surface.

M. At drip edges, refasten all metal flanges and reinforce using KM silicone and KM Polyester Fabric.

3.3 ELASTOMERIC COATING APPLICATION

A. All roof preparation materials shall be allowed to fully dry prior to full roof surface application of the elastomeric coating system.

B. Immediately prior to application of the coating system, all dust, dirt and other contaminants shall be blown off the roof surfaces to be coated using high pressure compressed air.

C. It is often easier to visually see splits, tears or other damage in the roof surface after application of the first coat**.** For this reason the roof surface should be inspected after application of the first coat for any damage that was not detailed previously.

D. The entire roof substrate shall receive elastomer coating applied as follows:
Note: Airless spray is the preferred method of application. A medium to heavy nap roller may be used for application over flat substrates. Brush or roller may be used for touch-up or detail work or for small areas that are not practical for spray application.

10-year Warranty Installations:

(1) Apply base coat of PS #220 at a minimum rate of 1 gallon per 100 sq. ft., 16 wet mils (0.6 l/m²), 11 mils dry film thickness (DFT).

(2) After allowing the base coat to dry, apply one (1) or more coats of PS #220 at a minimum rate of 1 gallon per 100 sq. ft., 16 wet mils (0.6 l/m²), 11 mils dry film thickness (DFT) per coat. Apply consecutive coats in a perpendicular direction to the previous coat.

(3) Minimum system thickness: 22 dry mils

or

(4) Once the KM Epoxy Primer is dry, apply one (1) coat PS #250 at a minimum rate of 1.5 gallons per 100 sq. ft., 24 wet mils (0.9 l/m²) for a 22 mil dry film thickness (DFT). If applied in multiple coats, consecutive coats should be applied in a perpendicular

direction to the previous coat of silicone and must be done within 24 hours of said application.

(5) Minimum system thickness: 22 dry mils

15-year Warranty Installations:

(6) Apply base coat of PS #220 at a minimum rate of 1.25 gallons per 100 sq. ft., 20 wet mils (0.75 l/m²), 14 mil dry film thickness (DFT).

(7) After allowing the base coat to dry, apply one (1) or more coats of PS #220 at a minimum rate of 1.25 gallon per 100 sq. ft., 20 wet mils (0.75 l/m²), 14 dry film thickness (DFT) per coat. Apply consecutive coats in a perpendicular direction to the previous coat.

(8) Minimum system thickness: 27 dry mils

or

(9) Once the KM Epoxy Primer is dry, apply one coat PS #250 at a minimum rate of 2.0 gallons per 100 sq. ft., 32 wet mils (1.2 l/m²), for a 30 mil dry film thickness (DFT). If applied in multiple coats, consecutive coats should be applied in a perpendicular direction to the previous coat of silicone and must be done within 24 hours of said application.

(10) Minimum system thickness: 30 dry mils

20-year Warranty Installations:

(11) Apply base coat of PS #220 at a minimum rate of 1.5 gallons per 100 sq. ft., 24 wet mils (0.96 l/m²), 16.5 mil dry film thickness (DFT).

(12) After allowing the base coat to dry, apply one (1) or more coats of PS #220 at a minimum rate of 1.5 gallons per 100 sq. ft., 24 wet mils (0.96 l/m²), 16.5 mil dry film thickness (DFT) per coat. Apply consecutive coats in a perpendicular direction to the previous coat.

(13) Minimum system thickness: 33 dry mils.

or

(14) Once the KM Epoxy Primer is dry, apply one coat PS #250 at a minimum rate of 2.5 gallons per 100 sq. ft., 40 wet mils (1.5 l/m²), for a 38 mil dry film thickness (DFT). If applied in multiple coats, consecutive coats should be applied in a perpendicular direction to the previous coat of silicone and must be done within 24 hours of said application.

(15) Minimum system thickness: 38 dry mils.

3.4 CLEANUP

A. Maintain work and work areas in a clean, safe condition at all times during reroofing installation. Remove excess materials, trash and debris from the jobsite daily.

B. At the completion of the project, clean area of any spills and containers, and clean up all roofing debris, leaving jobsite in a clean and orderly condition.

3.5 WARRANTY

A. Upon completion of the roof coating system, the Coating Manufacturer's Representative, Owner's Representative, Architect and Applicator shall make a final roof observation to determine the dry film thickness of the fluid applied membrane and to verify that the system meets the Manufacturer's requirements for warranty. The Contractor shall notify all interested parties in advance of said roof observation.

B. As a condition of the project's completion and acceptance, deliver to the Owner a copy of the fully executed, specified warranty from the Coating Manufacturer, following individual warranty guidelines.