**SECTION 07 56 00 - FLUID-APPLIED ROOFING**

1. **GENERAL**
	1. SUMMARY
		1. Section Includes: Remedial roof coating system applied over an existing metal roof system.
		2. The existing substrate should be sloped a minimum of 0.25 inches of vertical rise per 12 inches of horizontal run (1/4 in 12 slope) to promote positive drainage.
	2. RELATED SECTIONS

		1. Section 07 01 50 – Roof Repairs
		2. Section 07 62 00 – Sheet Metal Flashing and Trim
		3. Section 07 71 00 – Roof Specialties
		4. Section 07 72 00 – Roof Accessories
		5. Section 07 92 00 – Joint Sealants
	3. SUBMITTALS
		1. Action Submittals:
			1. Product Data: Manufacturer’s current technical data sheet for proposed products.
			2. Shop Drawings: Illustrate scope of work; include roofing details.
		2. Informational Submittals:
			1. Installer’s warranty sample.
			2. Manufacturer’s warranty sample.
				1. Manufacturer Authorized Applicator Credentials: Submit documents stating the applicator is approved to install the specified materials and can obtain the specified warranty. [Specifier Note: For projects requiring a Product Plus or Labor and Material warranty]
			3. Manufacturer’s field installation guide.
	4. QUALITY ASSURANCE
		1. Manufacturer Qualifications:
			1. Minimum 25 years’ experience in manufacture of silicone roof coatings.
			2. ISO 9001 certified.
		2. Roof Coating:
			1. UL Listed.
			2. FM Class 1, 4470 approved.
			3. NSF P151 Certified.
		3. Applicator Qualifications:
			1. Approved by roof coating manufacturer.
			2. Eligible to offer manufacturer’s warranty.
			3. Applicator shall be experienced with the installation of the same or similar waterproofing materials
		4. Adhesion Test
			1. Conduct an adhesion test to all differing surfaces that are to receive coating. Test(s) shall be performed in accordance with manufacturer’s written instructions. Document results.
	5. DELIVERY, STORAGE AND HANDLING
		1. Deliver materials and products in their original and unopened packaging.
		2. Materials shall have legible labels with the manufacturer’s name, lot numbers, and product identification visible.
		3. Handling and Storage:
			1. Store roof coating containers between 15- and 109-degrees F (minus 9 to 43 degrees C).
			2. Store other materials in accordance with the manufacturer’s instructions.
			3. Keep products out of direct sunlight.
		4. Dispose of all materials according to requirements of Authorities Having Jurisdiction.
	6. PROJECT CONDITIONS
		1. Ensure rooftop equipment and accessories are in place prior to surface preparation and roof coating application.
		2. Weather Conditions: Proceed with the Work only when existing and forecasted weather conditions will permit materials to be installed in accordance with the manufacturer’s written instructions and requirements.
		3. Substrate Conditions: Do not install materials over substrates that are damp, wet, or otherwise contaminated in such a way to prevent proper adhesion.
		4. Apply roof coatings at temperatures above 0 degrees F (minus 18 degrees C).
		5. Do not apply coating materials when temperatures are less than 5 degrees F (-15 degrees C) above dew point.
		6. Contact manufacturer for recommendations if applying coating to substrates over 120 degrees F (49 degrees C).
	7. WARRANTIES

**[SPECIFIER TO CHOOSE FROM ONE OF THE FOLLOWING MANUFACTURER WARRANTIES]**

* + 1. Manufacturer’s Product Warranty: Provide manufacturer’s standard product warranty.
			1. Warranty term: [10] [15] [20] years.
		2. Manufacturer’s Product Plus Warranty: Provide manufacturer’s Product Plus warranty.
			1. Warranty term: [10] [20] [30] years.
		3. Manufacturer’s Labor and Material Warranty: Provide roof coating manufacturer’s labor and material warranty.
			1. Warranty term: [10] [15] [20] years.
		4. Installer’s Warranty: Submit roofing installer’s warranty, signed by Installer, covering the work of this section, including all components installed, for the following term:
			1. Warranty term: [2] [5] [\_\_] years.
1. **PRODUCTS**
	1. GENERAL

		1. All products used as part of the Project must be acceptable to the manufacturer of the roof coating and used and installed in accordance with the product manufacturer’s requirements.
	2. MANUFACTURERS
		1. Specification is based on products by Momentive Performance Materials, Inc., 260 Hudson River Rd., Waterford, NY 12188, (877) 943-7325, <https://www.siliconeforbuilding.com/>
		2. Substitutions: [Under provisions of Division 01.] [Not permitted.]
	3. MATERIALS
		1. Silicone Roof Coating:
			1. Source: Enduris 3525.
			2. Description: High solids, solvent-free, alkoxy-based, moisture-cured, silicone roof coating by Momentive Performance Materials.
			3. Physical properties, tested to ASTM D6694:
				1. Tensile strength: 253 PSI, tested to ASTM D2370.
				2. Elongation: 550 percent, tested to ASTM D2370.
				3. Volume solids: 90 percent, tested to ASTM D1644-01.
	4. ACCESSORIES
		1. Seam Treatment and Flashing Materials:
			1. Enduris Liquid Flashing by Momentive Performance Materials.
			2. UltraSpan UST / USM pre-cured silicone transition sheets and molded corners by Momentive Performance Materials.
			3. Reinforcement fabric: RF100 series, 100 percent polyester spun-laced textile reinforcing fabric.
				1. Available widths: 4-inch, 6-inch, and 12-inch.
			4. SWS Silicone Sealant by Momentive Performance Materials.
		2. Walkway Coating: Enduris 3525 protection silicone coating, [yellow,] [contrasting color,] with granules installed in coating at the minimum rate of 30 pounds per 100 square feet.
		3. Slip Sheet: TPO single ply membrane for use as a slip sheet under loose-laid materials and equipment such as sleepers, pipe supports, etc.
2. **EXECUTION**
	1. INSPECTION
	**[SPECIFIER NOTE: KEEP ITEM ‘A’ BELOW IF IT IS AN ARCHITECTURAL METAL ROOF PANEL INSTALLED OVER A STRUCTURAL DECK.**
	**KEEP ITEM ‘B’ BELOW IF IT IS A STRUCTURAL METAL ROOF PANEL INSTALLED OVER PURLINS.]**

		1. Walk the interior of the building and if possible, observe the underside of the roof deck. Look for any issues that may indicate problems that need to be addressed, such as a damaged roof deck. Notify the appropriate entities of any deficiencies observed and ensure all deficiencies are corrected before beginning coating preparations.
		2. Walk the interior of the building and if possible, observe the underside of the roof panels. Look for any issues that may indicate problems that need to be addressed, such as rusted panels and water-damaged insulation. Note the presence of any skylights. Notify the appropriate entities of any deficiencies observed and ensure all deficiencies are corrected before beginning coating preparations
		3. Identify existing roof leaks and notify Owner if any leaks are present that cannot be stopped as part of the Project.
		4. Walk the roof system and look for roof defects and deficiencies to be addressed prior to coating installation. Examples of defective items are open seams, open laps, deficient sealant on storm collars, severe rust and corrosion, ponding conditions, poor condition of drain details and components, deteriorated sealant on surface-mounted counter flashings, deteriorated wall joint sealant, and pipe penetration flashing defects. All defects and deficiencies are to be corrected prior to application of the coating.
	2. PREPARATION
		1. Prior to beginning coating, conduct adhesion tests in accordance with manufacturer’s adhesion testing procedures; determine if primer or other surface preparation is required. Document adhesion test results.
		2. Mask or otherwise protect surfaces not to be coated.
		3. Review existing and imminent weather conditions including potential for extreme temperatures, relative humidity, frost, dew, and precipitation. Ensure that coating and accessory materials will have sufficient curing time.
		4. Surface Preparation and Repairs:
			1. Inspect the underside of deck for rust and deterioration. Take corrective measures before beginning coating preparations.
			2. Remove water-saturated insulation and replace insulation and metal panels.
			3. Mechanically remove loose and flaking rust.
			4. Replace or repair metal panels that are rusted through. Panel replacement shall be performed in accordance with industry standards.
			5. Replace or repair severely damaged metal panels. Panel replacement shall be performed in accordance with industry standards.
			6. Seal all laps and seams of curbs, gaps, flashings, angle changes, and penetrations with minimum 60 wet mils of liquid flashing or seam sealant.
			7. Inspect the roof ridges, hips, and eaves for the presence of foam closures and replace damaged or missing closures.
3. Inspect the roof for proper fastener placement at side and end laps. Install additional capped, gasketed fasteners, as needed, to comply with the following requirements.
	* + - 1. Panel ends are to have six (6) capped, gasketed fasteners installed per panel.
				2. Intermediate fastener placement shall be three (3) fasteners per panel.
				3. For open framing systems (purlins), side laps shall have fasteners installed through each purlin support and spaced a maximum of 20 inches on center (20” O.C.) between the purlin supports.
				4. For solid decking systems, ensure fasteners at the side laps are installed 20 inches on center (20” O.C.).
			1. Inspect the roof for loose or open side and end laps and install additional capped and gasketed fasteners, as needed, to close the laps.
			2. Replace all loose or missing fasteners using oversized, capped, gasketed fasteners.
			3. Seal all exposed fastener heads with liquid flashing.
			4. The tops of all surface-mounted counter flashings shall be encapsulated with a minimum of 60 mils of liquid flashing. Perform adhesion tests, if necessary, in accordance with the manufacturer’s instructions. Remove chalking from the existing sealant, if applicable.
			5. Seal all horizontal sheet metal flashing joints such as copings and expansion joint covers, by using a bond breaker and then covering with a minimum of 40 wet mils of liquid flashing or manufacturer-provided, compatible sealant. An example of a bond breaker is running a lumber crayon over the joint and then encapsulating it with the sealant. Standing seam joints are excluded from this requirement.
			6. All storm collars shall be sealed using liquid flashing or a compatible sealant approved by the coating manufacturer.
			7. Pressure wash roof surface at 2500 to 4000 PSI utilizing manufacturer’s recommended roof preparation wash or approved biodegradable detergent; remove oils and other materials that could interfere with adhesion. Rinse with clean water until no bubbles or suds remain. Allow to dry thoroughly. Extra time for drying may be necessary if water is present at the laps or in ponding areas such as on the upslope side of curbs.
			8. Double wash all areas where water collects as sediments and other debris will collect in these areas and can inhibit proper adhesion.
			9. Seal all exposed fasteners using liquid flashing.
			10. Replace all missing foam closure strips at eaves, ridges, and hips.
		1. Required Condition of Surfaces: Clean, sound, dry, and free of materials, laitance, chalking, and loose coatings that could inhibit proper adhesion of coatings or sealants. All penetrations, and flashings are to be sealed watertight prior to coating application.
	1. APPLICATION
		1. Apply roof coating in accordance with manufacturer’s instructions and approved drawings.
		2. Application rates will vary depending on the complexity of the project. The following rates do not consider waste. Applicator is required to calculate the waste factor needed. “Waste” includes material left in the buckets or barrels, on roller frame covers, inside hoses (when spray applied), etc. All application rates apply to both the roof and any walls or curbs to be coated.
		3. Include the stretch out of the metal panels so that all ribs, flutes, and pans are properly coated.
		4. Apply roof coating at rate of 1.5 gallons per 100 square feet to minimum 21 mils cured coating thickness.

\*\*\*\* OR \*\*\*\*

* + 1. Apply roof coating at rate of 2.0 gallons per 100 square feet to minimum 28 mils cured coating thickness.

\*\*\*\* OR \*\*\*\*

* + 1. Apply roof coating at rate of 2.5 gallons per 100 square feet to minimum 36 mils cured coating thickness.
		2. Apply coating by squeegee, brush, roller, airless sprayer, or a combination of these.

Apply liquid flashing by brush, trowel, gloved hand, or with a bulk caulking gun.

* + 1. Final Roof Coating: Monolithic and seamless, encapsulating entire roof surface.
		2. Walkway Protection (Optional)
		At all roof access locations and around all rooftop equipment requiring servicing, apply walkway coating a minimum of 60 wet mils thick, simultaneously embedding roofing granules at the rate of approximately 35 pounds per 100 square feet (16 kilograms per 9.25 square meters). Walkway shall be a minimum of 30 inches (760mm) wide. Mask sides to achieve straight lines.
		3. Lift and coat under all sleeper supports, including both wood and manufactured supports, for service lines and rooftop equipment such as mechanical units, satellite dishes, etc. After coating has cured, all supports shall have a slip sheet placed under them to protect the coating. Slip sheet shall extend past the edges of the sleeper a minimum of 1 inch on all sides.
	1. CLEANING
		1. Clean finished roof surface after completion; ensure that drainage components are not clogged.
	2. PROTECTION
		1. Protect roof coating from foot traffic and damage during curing process. A cure time of 3 days is recommended to achieve full cure.
	3. FIELD QUALITY CONTROL
		1. Verify proper application rates by using a wet film gauge. Check wet film thickness as much as possible. A minimum of once every 100 square feet (9.25 square meters) is recommended.
		2. Verify cured mil thickness of coating at end of work and prior to warranty inspection.
		3. Repair deficient areas with liquid flashing or roof coating, as applicable to size of deficient area.
		4. Roof coating is subject to pre-job, progress, and final inspections by coating manufacturer or its designated third-party inspectors.

END OF SECTION