

System Specifications

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100% Silicone Roof Coating System For Metal Roofing

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100% Silicone Roof Coating System For Metal Roofing

Part 1 General

(Dec 2019)

This specification is a guide for coating and restoration of metal roofs utilizing the Mule-Hide 100% Silicone Roof Coating and accessory products.

1.1 Scope of Work

- A. Contractor will provide all labor, equipment and Mule-Hide labeled materials necessary to install a 100% Silicone Roof Coating System.
- B. Mule-Hide's most current Product Data Sheets and installation instructions shall be followed in conjunction with this specification.
- C. Contractor to replace any severely rusted panels with similar materials prior to installing the Silicone Roof Coating System.
- D. When inspecting a metal roof and creating an estimate of materials needed to complete the project, do not assume a deck having a profile (such as an "R-panel, 4-inch RIB panel, standing seam panel, etc.) as a flat surface. The contractor is solely responsible for determining the additional surface of the panel created by the profile. Each different style of panel will create different amounts of surface area that must be included when determining the amount of coating necessary to coat the metal roof at a uniform thickness.
- E. Coverage rates indicated in this specification **Do Not** include calculations for waste. When installing liquid products, the contractor must include a waste factor when calculating quantities of material necessary to meet the project requirements.

1.2 Related Sections

- A. Related sections may or may not be applicable to this specification.
- B. Section 07 62 00: Sheet Metal Flashing and Trim: Metal flashing and counterflashing installation and requirements.
- C. Section 22 30 00: Plumbing: Roof drains, scuppers, gutters and downspout installation and requirements.

1.3 References

- A. ASTM D6694 Standard Specification for Liquid-Applied Silicone Coating
- B. NRCA Roofing and Waterproofing Manual
- C. Underwriters Laboratories Building Materials Directory
- D. CRRC (Cool Roof Ratings Council)

1.4 Submittals

- A. Submit Product Data Sheets (PDS) confirming physical and performance properties of each product used in the system.
- B. Submit Safety Data Sheets (SDS) for each product used in the system.
- C. Submit a roof survey including roof type, measurements and descriptions of the condition of the seams, penetrations, drains, gutters, known leaks and a moisture scan or test cuts with an indication of moisture content. Photographs of all conditions should be included in the submission.
- D. Submit a sample copy of the requested warranty type.

1.5 Quality Assurance

- A. Manufacturer Qualifications: Mule-Hide Products Co., Inc. shall provide a roofing system that meets or exceeds the criteria listed in this section.
- B. Contractor must be a Mule-Hide Warranty Eligible Contractor approved for the installation of the products utilized in this system specification.
- C. Supplier shall retain batch samples of all coating products used in the system for a minimum of 5 years.

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- D. Prior to work commencing, the Mule-Hide Warranty Eligible Contractor shall submit a fully completed Silicone Roof Coating System Warranty Application to the Mule-Hide Technical Department. Included shall be an accurately dimensioned roof drawing plus photos of any unusual flashing details or roof conditions.
- E. Contractor shall furnish all insurance, licenses, permits and certifications as required by local authorities and/or the property owner.
- F. Contractor shall ensure that all work performed at the site shall be in accordance with National Roofing Contractors Association (NRCA) Low Slope Roofing Manual recommendations and all other pertinent guidelines issued by the NRCA in reference to other types of construction present at the job site.

1.6 Product Delivery, Storage and Handling

- A. All products delivered to the job site shall be in their original unopened containers or wrappings and clearly labeled with the manufacturer's name, product identification and date of manufacture.
- B. Store all materials in a dry, clean area protected from the elements and damage. Place all stored materials on pallets and cover with a tarpaulin. Keep out of direct contact with sunlight.
- C. All liquid products and caulks shall be stored at temperatures between 60°F and 80°F. Materials exposed to lower temperatures affect the workability and performance of the product. Products shall be restored to the above temperature prior to use.
- D. All flammable materials shall be stored in a cool, dry area away from open flames and sparks. Follow precautions outlined on containers or supplied by the material manufacturer/supplier.
- E. All materials determined as being damaged (confirmed by Mule-Hide) due to improper storage on the job site are to be replaced with new materials.

1.7 Job Conditions

- A. The roof must be clean, dry and free of areas of ponding water, ice, snow, rain or dew, oils, grease, particulate matter or other debris.
- B. Roof must be inspected for the following existing conditions:
 - 1. Damage to the metal panels or flashings
 - 2. Loose or missing fasteners
 - 3. Peeling and chalking of previous coatings
 - 4. Poorly attached vents or other projections
 - 5. Open seams and side laps
 - 6. Areas of ponding water – areas of dirt/debris accumulation
 - 7. Broken or improperly flashed pipes
 - 8. Loose or damaged perimeter edge metal
- C. All deficiencies must be properly corrected prior to the installation of the new Silicone Roof Coating System.
- D. The contractor shall follow and comply with all safety regulations as recommended by OSHA.
- E. Any unusual or concealed condition discovered during the preparation of the existing roof surface or installation of the Silicone Roof Coating System is to be reported to the owner and Mule-Hide immediately in writing. Work is to be halted until the owner has responded with a solution to the problems.
- F. All local building codes and requirements should be followed where applicable. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements.
- G. All air intake ventilation equipment should be shut off and all ductwork openings should be temporarily sealed during product application.
- H. All equipment should be grounded during operations.

1.8 Precautions

- A. Coatings require mixing immediately prior to application. All containers shall be thoroughly mixed with a mechanical mixing device for a minimum of 5 (five) minutes each. Mix at low speed to avoid entraining air into the coating. Coatings shall be mixed no more than 1 (one) hour prior to use.
- B. This product cures through absorption of moisture from the air. Avoid entraining air when mixing. Do not mix at high speeds.
- C. Remixing of 100% Silicone Roof Coating is permitted as necessary.
- D. Remixing of Mule-Hide 2-Part Epoxy Primer after expiration of its pot life is not permitted.
- E. No products with a "Flash Point" below 100°F shall be permitted due to associated fire hazard.
- F. No products with chlorinated "Toxic Exempt" solvents including perchloroethylene, 111 trichloroethane or methylene chloride or isocyanates shall be utilized due to the associated health hazards to workers and building occupants.
- G. No asphalt or vegetable based oils may be used in the production of any product included in this specification.

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- H. Materials should be maintained at a minimum temperature of 50°F for 24 hours prior to the application to ensure the optimal application qualities.
- I. Do not apply coating when ambient temperature is within 5°F of the dew point.
- J. Do not apply coatings during or just before rain, inclement weather or on frost covered or wet surfaces.
- K. The roof surface must be a minimum of 35°F to ensure that frozen condensation is not present on the roof surface.
- L. The roof surface should not exceed a maximum of 100°F to avoid blisters and pinholes.

1.9 Protection of Buildings and Adjacent Areas

- A. It is the sole responsibility of the installing contractor to protect all surfaces adjacent to the surfaces to be coated including but not limited to, windows, doors, equipment and wall surfaces, either from overspray, brushing or rolling of the coatings being installed.
- B. All roof top air intake equipment should be turned off and all openings should be sealed to prevent any fumes from entering the building.
- C. When spraying, parking lots adjoining the building should be blocked off sufficiently to protect vehicles from wind borne overspray.

1.10 Warranties

Mule-Hide Roof Coating NDL System Warranties ("System Warranties") are available for commercial projects when approved by Mule-Hide and installed in compliance with Mule-Hide's published specifications and details. System warranties are only available when applied for and installed by Mule-Hide Warranty Eligible Contractors. System Warranties are not available for residential projects. The Roof Coatings Material-Only Limited Warranty is available for both residential and commercial projects. Mule-Hide defines a residential project as a single-family dwelling.

- A. Roof Coatings Warranty Application forms must be fully completed and submitted to the Mule-Hide Technical Department prior to beginning the project. Issuance of a warranty will be dependent upon completion of the project to the satisfaction of Mule-Hide and payment of any required warranty fees. Mule-Hide reserves the right to decline to issue any warranties for projects completed before the submittal of the proper Warranty Application to Mule-Hide.
- B. Mule-Hide's Silicone Roof Coating Material-Only Limited Warranty
 - 1. Mule-Hide offers a 10, 15, or 20-year Roof Coating Material-Only Limited Warranty for residential projects and commercial projects. This warranty covers leaks due to manufacturing defects only and does not include coverage for labor costs, leaks due to workmanship of the installed products, leaks caused by movement or deterioration of the existing roof surface to which the Acrylic Roof Coating System has been applied, leaks caused by other substrate conditions, other components not supplied by Mule-Hide and does not cover the appearance, cleanliness, discoloration or staining of the coating for any reason.
 - 2. Mule-Hide does not perform inspections of the installation before issuing the Roof Coatings Material-Only Limited Warranty. A Mule-Hide Warranty Application and the appropriate fee (if required) must be submitted to Mule-Hide to obtain this warranty. Proof of purchase (invoices) is required. See the Mule-Hide Roof Coatings Material-Only Limited Warranty sample for specific terms and conditions. This warranty is not transferrable.
- C. Mule-Hide's 20-year Premium Material-Only Warranty
 - 1. Available to warranty eligible contractors only. This warranty covers labor associated with leaks directly caused by product defects. This does not include coverage for labor costs associated with leaks due to workmanship of the installed products or other items noted above. Available for both residential and commercial projects, fees and additional information is available on the applicable warranty application.
- D. Mule-Hide's Roof Coatings NDL System Warranties for Commercial Buildings
 - 1. Mule-Hide offers a 10, 15 or 20-year Roof Coatings NDL System Warranties. The Roof Coatings NDL System Warranty is available through Mule-Hide Warranty Eligible Contractors only for commercial projects. This warranty is not available for residential projects. This warranty covers leaks due to manufacturing defects, premature weathering and the contractor's workmanship of the installed product. This warranty does not cover leaks due to movement or deterioration of the existing roof surface to which the Silicone Roof Coating System has been applied, leaks caused by other substrate conditions, components not supplied by Mule-Hide and does not cover the appearance, cleanliness, discoloration or staining of the coating for any reason.
 - 2. See the Mule-Hide Roof Coatings NDL System Warranty sample for specific terms and conditions. Please contact the Mule-Hide Technical Department for information and requirements regarding the Mule-Hide Roof Coatings System Warranty Program.

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Mule-Hide Roof Coatings System warranties require the following minimum application rates:

Warranty Type	Cleaner	Primer	Seams and Fasteners	100% Silicone Roof Coating
10-year	Clean with 115 Cleaner applied with low pressure sprayer then power washed.	Surfaces requiring primer shall require 1 coat @ .25 gal/100 sf.	100% Silicone Sealant applied @ 1 gal/100 linear feet of seams and applied @ 1 gal/ 350-400 fasteners	1 coat @ 1.5 gal/100 sf (24 wet mils, 23 dry mils) or 2 coats @ .75 gal/100 sf (12 mils wet, 11.5 mils dry per coat)
15-year	Clean with 115 Cleaner applied with low pressure sprayer then power washed.	Surfaces requiring primer shall require 1 coat @ .25 gal/100 sf.	100% Silicone Sealant applied @ 1 gal/100 linear feet of seams and applied @ 1 gal/ 350-400 fasteners	1 coat @ 2.0 gal/100 sf or 2 coats @ 1.0 gal/100 sf (16 wet mils, 15 dry mils per coat) Total coating of 2 gal/100 sf (32 wet mils, 30 dry mils)
20-year	Clean with 115 Cleaner applied with low pressure sprayer then power washed.	Surfaces requiring primer shall require 1 coat @ .25 gal/100 sf.	100% Silicone Sealant applied @ 1 gal/100 linear feet of seams and applied @ 1 gal/ 350-400 fasteners	2 coats @ 1.25 gal/100 sf (20 wet mils, 19 dry mils per coat) Total coating of 2.5 gal/100 sf (40 wet mils, 38 dry mils)

Note: Minimum application rates listed do not include thickness of primers or areas where additional coatings and reinforcement are required.

Part 2 Products

2.1 General

- A. The components of the Mule-Hide Silicone Roof Coating System shall be products manufactured or supplied by Mule-Hide Products Co., Inc.
- B. Components other than those supplied or manufactured by Mule-Hide may be submitted for review and acceptance by Mule-Hide's Technical Department. Any product requested for review and acceptance must be submitted prior to the job start. Mule-Hide's acceptance of any other product is based solely on chemical compatibility and published performance data provided by the component manufacturer. Other components may be considered on a job-by-job basis and must be approved in writing by Mule-Hide's Technical Department. Mule-Hide offers no warranty or guarantee for the performance or suitability of any component not supplied or manufactured by Mule-Hide.

2.2 Products

The primary product comprising the Silicone Roof Coating System shall be the Mule-Hide 100% Silicone Roof Coating that meets or exceed the requirements of ASTM D6694. This product is a 100% silicone based, single-component roof coating that creates a barrier that is resistant to normal weathering, is durable, breathable and weatherproof. Refer to the Mule-Hide Product Data Sheets for physical properties and additional information.

2.3 Accessory Products

The following Mule-Hide materials must be used to install Mule-Hide Silicone Roof Coating Systems. Mule-Hide will not warrant any application where another manufacturer's product is substituted for a Mule-Hide product. All products listed below are physically and chemically compatible with each other.

- A. 115 Cleaner – a biodegradable detergent wash suitable for cleaning and preparing metal and aged roof surfaces (including but not limited to smooth BUR, modified bitumen, EPDM, TPO, Hypalon (CSPE) and PVC roof systems).
- B. Si 2-Part Epoxy Primer – a 2-part epoxy intended for preparing areas of light ponding (as defined by Section 3.2.C.) and rusted metal prior to coating with Mule-Hide's 100% Silicone Roof Coating or 100% Silicone Sealant. The application rate is .25 gal/100 sf for smooth surfaces, and .5 gal/100 sf for granulated surfaces.
- C. 100% Silicone Sealant – a high solids non-shrinking, moisture cure silicone sealant intended for sealing joints in masonry, architectural metal, metal roof seams and fasteners and miscellaneous repairs prior to coating.
- D. MP Liquid Sealant – a single component, non-shrink, polyurethane sealant used for filling/topping pitch pans.

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- E. ShapeShift Pitch Pans – high-strength polymer straight and outside corner sections that snap-lock together to create custom sized pitch pans to seal around various roof penetrations.
- F. Tietex® 325 Poly Fabric – a stitch-bonded polyester product that offers high-strength properties with good elongation for excellent thermal stress force accommodations. Tietex 325 Poly Fabric is a soft polyester that will readily conform to surface irregularities and is easy to handle.
- G. Walkway Granules – Mule-Hide Walkways granules are colored EPDM granules available in gray or safety yellow used with the 100% Silicone Roof Coating to provide a non-slip surface over a Mule-Hide 100% Silicone Roof Coating in areas of foot traffic or service areas.

2.4 Equipment

- A. Spray Equipment (optional) – Mule-Hide recommends the Graco GH 933ES Hi-Flo Big Rig sprayer with a Monarch 5:1 pump, 3/4" material hose (7,250 psi) up to 250 ft., 1/2" whip, XHF spray gun (7,250 psi) with a XDF 7,250 psi tip (.029 - .035). The recommended pressure at the gun should be 3,000 psi while spraying (Note: Pump lower must be set to maximum lower-ball travel). Please contact Mule-Hide Technical Department for more detailed information. Note: Use of the Monarch pump requires the use of an air compressor capable of delivering 20CFM @ 90 psi.
- B. Miscellaneous equipment includes 3/4" to 1-1/4" nap, lint free, 9" roller covers and rollers, 6' handles, 4" double wide chip brushes, roofers' trowels, scissors for cutting fabric and a 1/2" power drill with mixing attachment.
- C. Miscellaneous hand and power tools may be required to complete any repairs to the existing roof.

Part 3 Execution

3.1 Examination

- A. Prior to bidding the project a pre-inspection of the roof should take place with the Warranty Eligible Contractor and a Mule-Hide representative (local Territory Manager) to review the conditions of the roof and determine if the roof is suitable for the application of a Mule-Hide Silicone Roof Coating System. Mule-Hide requires a moisture scan of the entire roof submitted on Mule-Hide's Moisture Scan Report. This should be followed up with core cuts to confirm the actual condition.
- B. Adhesion Tests
 - 1. The decision to perform adhesion tests should be determined at the time of the pre-inspection. Any metal roof systems having an existing coating covering the roof surface shall be required to have adhesion tests performed. While adhesion tests are not always needed when coating a bare metal roof, they are required when the metal panels are pre-painted or are covered with an existing coating applied that will not be removed. While there is no actual ASTM test method for field testing of adhesion for roof coatings, many manufacturers will reference ATSM D903 or ASTM D3359. Mule-Hide follows ASTM D903 and ASTM D6083 with the following modifications.
 - a. If the existing coating is multiple layers of aluminum, all layers must be removed or the roof is not acceptable for the Silicone Roof Coating System. Adhesion tests are required after cleaning.
 - b. If the roof surface has been coated with an emulsion, the roof is not acceptable for the Silicone Roof Coating System.
 - c. If the roof surface has been coated with an acrylic coating that is in good condition, the application of the primer may not be required. Adhesion tests should be performed with and without the primer. Contact Mule-Hide Technical Department for additional guidelines to determine if a primer is needed. Adhesion tests must be submitted to Mule-Hide for review prior to starting the project.
 - d. Factory painted roof panels should have adhesion tests performed as the finish may be Kynar. Silicone will not bond well to a Kynar finish. Kynar requires the use of the Si 2-Part Epoxy Primer.
 - 2. Perform a minimum of two (2) tests, or a minimum of one (1) test per 100 squares (10,000 square feet) of roof surface. If the roof is divided up into several sections, then each section shall be addressed as an individual roof and the minimum test requirements shall be followed for each section.
 - 3. Performing adhesion tests
 - a. Using 100% Silicone Roof Coating
 - i. Thoroughly clean an area a minimum of 12" square (12" by 12").
 - ii. Pre-cut several strips of Tietex fabric 1" wide and 8" to 10" long.
 - iii. Brush apply a coat of the 100% Silicone Roof Coating. The coating is applied at a rate of 1.0 gal/100 sf.
 - iv. Immediately embed the Tietex fabric into the coating centering it in the coating but leaving about 3" to 4" of the strip laying loose past the edge of the coating. Dry brush the fabric into the coating to ensure complete embedment and leaving no voids, air pockets or wrinkles.
 - v. Apply a second coat of the 100% Silicone Roof Coating at the same rate as the first coat.
 - b. Repeat this procedure for each adhesion test.
 - c. Allow the test patches to dry a minimum of 4 to 5 days before conducting the tests.

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- d. When conducting the tests, lift the loose fabric and pull slowly straight up, do not “jerk” the tag end of the fabric. If the fabric separates from the coating, leaving the coating still adhered to the roof membrane, the test is a “pass”. If the coating separates from the roof surface, the test is a “fail”.
 - e. If adhesion tests fail using 100% Silicone Roof Coating, then the tests must be repeated using 2-Part Epoxy Primer.
4. When repeating the tests, complete the steps as above, except, prior to applying the 100% Silicone Roof Coating, the surface is primed using Si 2-Part Epoxy Primer at the rate of .25 gallons per 100 sf allowing the primer to dry a minimum of two hours.
 5. If the adhesion tests pass with the 100% Silicone Roof Coating, the roof may be coated without the use of the Si 2-Part Epoxy Primer.
 6. If adhesion tests only pass with the use of the primer, the entire roof surface must be primed.
 7. If adhesion tests fail with both 100% Silicone Roof Coating and Si 2-Part Epoxy Primer, contact Mule-Hide Technical Department to discuss further options/remedies.
 8. Adhesion test failures may disqualify the roof as acceptable for application of the Silicone Roof Coating System.
 9. Mule-Hide requires the contractor schedule with the local Mule-Hide Territory Manager to observe the removal of the fabric during the adhesion tests (preparation and application do not require observation).

3.2 Existing Conditions and Remedies

- A. Prior to the commencement of work, the roof shall be re-inspected and any conditions not included in the roof survey shall be added and noted. All new information must be communicated to the Mule-Hide prior to starting work.
- B. The roof assembly must be structurally sound and free of damaged panels, buckling, or loose or damaged metal flashings. Defects shall be remedied prior to the installation of the Silicone Roof Coating System.
- C. No areas shall retain water more than 48 hours or at a depth exceeding 1/4” at any time. Drains shall be installed as to allow positive drainage of the roof surface. Retained water may not cover more than 5% of the roof surface.
- D. Fasteners shall be inspected and tightened where loose. Replace any missing or stripped fasteners with new fasteners of a slightly larger diameter. Stitch-fasten deflected metal panels and loose seams to ensure a secure substrate eliminating all gaps.
- E. Existing flashings shall be properly terminated according to NRCA guidelines or the original membrane manufacturer's specifications. Defective terminations shall be remedied. Damaged flashings shall be repaired prior to installation of the Silicone Roof Coating System.
- F. Curbs and penetrations must not interrupt the flow of water off the roof. If defects are present, install crickets to divert water around the penetrations.
- G. The existing roof system should be tested to ensure the roof assembly is dry and free of any leaks prior to the application of the roof coating system. It is the installing contractor's responsibility to repair or replace damaged roof panels, other metal roof components and verify the existing metal roof system is leak free.
- H. If the existing roof surface has been previously coated, adhesion tests must be performed. See Section 3.1.B. Adhesion Tests. If there is a concern for the type of finish on a metal panel such as Kynar, adhesion tests must be performed.

3.3 Surface Preparation

- A. Mechanically remove all loose coatings and/or patching material as is possible. Wire brush, sandblast or mechanically abrade until the substrate is smooth and rust free. Remove all debris, dirt and other loose contaminants from the roof surface prior to cleaning.
- B. The roof surface shall be cleaned with Mule-Hide 115 Cleaner in accordance with Mule-Hide's most current Product Data Sheet. Do not dilute the 115 Cleaner. Apply direct to the roof with a mop, pump sprayer or other suitable low-pressure sprayer at a rate of .25 to .5 gallon per 100 square feet. Avoid contact with painted surfaces or vinyl siding. Allow wet contact with the roof surface for a minimum of 15 minutes. Areas that are heavily contaminated or working in hotter temperatures may require an increased application rate from .5 gallon to 1 gallon per 100 square feet. Rewet the membrane with additional cleaner if needed. Agitate roof surface with stiff bristle broom or orbital scrubber. Heavily contaminated areas may require multiple cleanings with scrubbing to obtain a clean membrane.
- C. Rinse the roof surface with clean water and a minimum 2,000 psi power washer until no 115 Cleaner residue remains. Allow roof to dry completely prior to system installation. Spot check the dried membrane with a clean rag by wiping the surface of the membrane to determine if any residue remains. If the cloth shows signs of residue (dirt or chalk) then repeat the rinsing of the membrane. A second cleaning application may be required.
- D. The contractor must be careful not to damage the existing membrane or inject water into the system while cleaning.
- E. Check local building ordinances for acceptable disposal of the rinse water. Many areas do not permit discharge into sewer systems or water containment areas. Compliance with local building codes and ordinances is the sole responsibility of the contractor.

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- F. Any metal panels, flashings, vents, ridge caps or other metal components, if found to be damaged, weakened or corroded to the point of compromising the metal roof system must be replaced.
- G. All substrates must be clean and dry prior to priming or coating.
- H. Areas of ponding water and rusted metal must be primed with the Mule-Hide Si 2-Part Epoxy Primer applied in 1 coat at an application rate of .25 gallon per 100 square feet (4 wet mils). Allow the primer to dry a minimum of 2 hours prior to application of 100% Silicone Sealant or 100% Silicone Roof Coating. The Si 2-Part Epoxy Primer will improve adhesion and block staining. Areas of heavy rusting may require the Si 2-Part Epoxy Primer be applied in 1 coat at an increased application rate of .5 gallon per 100 square feet (8 wet mils) to fully encapsulate the rust. Allow primer to dry until the next day (minimum of 8 hours).

3.4 Application

- A. All prep work including completion of flashings, seams, penetrations, areas requiring fabric or other details shall be completed prior to coating the roof surface with the 100% Silicone Roof Coating. If the Si 2-Part Epoxy Primer is required, the primer must be applied prior to completing any prep work. Si 2-Part Epoxy Primer is applied at a rate of .25 gal/100 sf.
- B. Seams and End Laps
 - 1. All metal panel side seams (void of caulks, tapes or asphalt) shall be sealed with Mule-Hide 100% Silicone Sealant applied at a thickness of 1/8" and extended a minimum of 1" to either side of seam.
 - 2. Metal panel side seams which have been repaired using repair tapes that cannot be removed must be sealed with Tietex fabric embedded and covered with the 100% Silicone Roof Coating. The overlap of the Tietex fabric and 100% Silicone Roof Coating on both sides of the repair tape must extend a minimum of 3-1/2 inches past the edges of the repair tape.
 - 3. Existing repairs to metal panel side seams made with asphalt mastic, or urethane, silicone or acrylic caulks must be removed. Once fully removed and the surface of the metal cleaned, the seams shall be checked for gaps. Gaps greater than 1/4" wide shall be stitch fastened together with fastener spacing not to exceed 12" on center to ensure a continuous substrate eliminating gaps. Seams are then sealed with Mule-Hide 100% Silicone Sealant applied at a thickness of 1/8", extended and feathered a minimum of 1" to either side of the seam.
 - 4. End laps in good condition, not showing signs of expansion/contraction shall be caulked with 100% Silicone Sealant applied at a thickness of 1/8", extended and feathered a minimum of 1" to either side of the lap edge.
 - 5. End laps showing signs of movement shall require an application of the 100% Silicone Sealant applied by trowel or brush at a thickness of 3/16" to 1/4" thick, extended and feathered a minimum of 2" to each side of the end lap. Additional fasteners to secure loose panels may be required.
 - 6. Repairs to seams and end laps made with asphalt mastic, urethane, silicone or acrylic caulks that cannot be removed must be sealed with Tietex fabric embedded and covered with the 100% Silicone Roof Coating. Asphalt mastics must be primed with Si 2-Part Epoxy Primer at an application rate of .25 gallon per 100 square feet and allowed to dry a minimum of 2 hours.
 - a. The overlap of the Tietex fabric and the 100% Silicone Roof Coating over the repair material must extend a minimum of 3-1/2 inches beyond the edges of the repair materials. The 100% Silicone Roof Coating should be feathered a minimum of 1 inch beyond the Tietex fabric.
 - b. Apply the 100% Silicone Roof Coating at 1 gallon per 100 square feet and immediately embed the Tietex fabric. Dry brush the fabric smooth to ensure no wrinkles or voids exist. Apply a second coat of 100% Silicone Roof Coating over the fabric at an application rate of 1 gallon per 100 square feet to fully encapsulate it. Allow to dry until the next day (minimum of 12 hours) prior to applying the 100% Silicone Roof Coating.
- C. Fasteners
 - 1. All fasteners shall be checked and tightened as necessary.
 - 2. All fasteners that have been stripped or neoprene washers are missing or damaged shall be replaced with new oversized fasteners with neoprene washers.
 - 3. All fasteners shall be sealed with Mule-Hide 100% Silicone Sealant. Fasteners shall be completely covered by the sealant. One gallon will cover and seal approximately 350 - 400 fasteners.
- D. Flashings and Penetrations
 - 1. Flashings are sealed using 100% Silicone Roof Coating and Tietex fabric, similar to reinforcement on a repaired seam. All penetrations (pipes, curbs, scuppers, and wall transitions) are sealed in the same manner.
 - 2. Flashings and penetrations that cannot be sealed utilizing reinforcing fabric due to their shape or location shall be coated with just the 100% Silicone Sealant. Apply with a brush or trowel 1/8" thick to 1/4" thick and taper all edges. Allow to dry until the next day (minimum of 12 hours) prior to applying the 100% Silicone Roof Coating.
 - 3. All flashings and details shall be completed prior to the installation of the 100% Silicone Roof Coating.
- E. Silicone Roof Coating Application
 - 1. Make sure all roof surfaces to receive the roof coating, are clean, free of any contamination or debris and are dry. Make sure all prep work is completed and dry prior to starting coating of the roof surface.

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100% SILICONE ROOF COATING SYSTEM FOR METAL ROOFING

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2. Thoroughly stir all containers of 100% Silicone Roof Coating prior to application. Do not thin this product. This product cures through absorption of moisture from the air. Avoid entraining air when mixing. Do not mix at high speeds. Dry time will be faster in humid conditions. Do not apply this product over damp or wet surfaces.
 3. Open and partially full containers will skin over quickly. If this occurs, remove skin and continue using the remaining product. Mule-Hide recommends applying the 100% Silicone Roof Coating in two coats for best results, either spraying or rolling.
 4. Apply a base coat of 100% Silicone Roof Coating at the application rate as determined by the warranty requirements. See Section 1.10 Warranties for applicable rates. Extra material is required for height of the ribs. (Example: a standard low-profile R Panel requires approximately 15% to 20% extra coating material per 100 square feet per coat). Material is fast drying. Do not distribute excessive amounts onto the roof surface prior to rolling. Do not over roll as a textured finish will result. Allow coating to dry. Typical drying time between coats at ambient temperature is 2 to 4 hours.
 5. Apply a second coat (when determined by the warranty requirements) of 100% Silicone Roof Coating at the same application rate as the first coat. The second coat should be applied perpendicular (90 degrees) to the direction the first coat was applied. Material is fast drying. Do not distribute excessive amounts onto the roof surface prior to rolling. Do not over roll as a textured finish will result.
 6. If spraying, use a multi-pass technique for each coat to obtain even results. Protect unintended surfaces from overspray. It is not recommended to use a spray application if any wind is occurring.
 7. Use a wet film thickness gauge during installation to confirm application rates.
 8. See Section 1.10 Warranties for information on wet/dry film thickness requirements for the various warranties available from Mule-Hide.
- F. Walkway Areas
1. Walkways may be constructed over newly installed silicone roof coatings with the use of the Mule-Hide Walkway granules and additional silicone coating.
 2. Create outlines for the walkways by taping these areas off with masking or painters tape.
 3. Apply a fresh coat of 100% Silicone Roof Coating at a rate of .75 to 1.0 gal/100 sf (12 to 16 wet mils).
 4. As soon as the silicone is applied immediately broadcast the granules into the wet coating at a minimum rate of 15 lbs. per 100 square feet. Make sure the granules completely cover the new coating.
 5. As soon as the granules are broadcast, remove the tape. Do not wait for the silicone to dry.
 6. Do not let the silicone skin over before applying the granules as the granules will not adhere to the silicone. The silicone must be wet.
 7. Allow the coating to dry until the next day. Once dry, vacuum the loose granules to prevent the excess from going into drains or gutters.
 8. Over time, walkway surfaces may wear, but can easily be repaired or resurfaced by applying additional 100% Silicone Roof Coating and new granules.
- Note: Walkways are maintenance items not covered by Mule-Hide warranties. Additional coating and granules and their application are the responsibility of the building owner.

3.5 Protection

Always follow OSHA guidelines for proper safety clothing and equipment when spraying products.

3.6 Clean-Up

Remove all containers, equipment, and debris from the rooftop and project site upon project completion. Refer to each individual Product Data Sheet for clean-up of each individual product.

Note: When estimating materials necessary to complete a Silicone Roof Coating System it is the Contractor's responsibility to include material calculations for waste.

END OF SECTION