

The following specifications are designed to summarize the activities and responsibilities of all the principal parties to a roofing project. Oftentimes, the guide specification will function as the primary bid document when authorizing a roofing contract. These detailed instructions are intended to govern both the application itself and the process of awarding the work and issuing a warranty. Since no two roofs are exactly alike, further adjustment of the specification may be required. The guide specifications are typically used as a model for initial review purposes, then customized with Truco personnel prior to the solicitation of bids.

METAL ROOF RESTORATION

This document provides sample specifications, product data and application guidelines for the installation of rubber coatings for the repair and restoration of metal roofs.

PART ONE - GENERAL

1.01 DESCRIPTION

A. General: Provide all labor, materials, equipment and tools as required to repair and coat existing metal roof area with new materials as specified

B. The installation is understood to include sealing of roof joints, including but not limited to fasteners, seams, curbs, and penetrations. All preparatory work will then be encapsulated with two coat's of rubber roof coating.

1.02 QUALITY ASSURANCE

A. Qualifications of Manufacturer

1. Provide primary roof coating product from a single manufacturer which has successfully marketed and supplied the products for not less than three years. Provide secondary accessory materials only as recommended and approved by manufacturer of primary materials.

2. Primary products shall include spray, brush, and trowel grade coatings, polyester membrane, and rust conditioning materials.

3. Products primary and secondary shall be manufactured in United States of America

B. Qualifications of Contractor

1. The Contractor shall use adequate numbers of qualified workers who are thoroughly trained in the crafts and techniques required to properly install the type of roof coating proposed for use and other work required to complete the work specified.

2. A single installer (roofing contractor or industrial painter) will perform the work. The installer must be trained and certified by product manufacturer, and show written evidence of his authorized status.

3. The installer will own or have access to the equipment necessary, and shall meet all safety, insurance, and technical requirements of the building owner.

C. Warranty

1. The Contractor shall coordinate all necessary inspections, corrections, re-inspections (if any), and certifications with the coating manufacturer as required.

2. Warranty requirements apply only to roof coating to be applied to metal roof areas as described in base bid of this section.

3. Warranty period is for 10 years, and shall start at date of substantial completion

1.03 Preliminary Roof Inspection

A. Upon award of bid proposal, the roofing installer and manufacturer's representative shall tour the roof area. Manufacturer's representative will record and submit any disputes or concerns governing the installation of the roof system. The installer will complete and submit the manufacturer's "Roof Inspection Report" along with pre-application photos depicting the overall roof area and details representative of the installation.

1.04 Preliminary Project Review

A. Provide and review the following documentation to all parties directly concerned with the work, including the building owner, property manager, architect or roofing consultant:

B. Specification, including product data, warranty terms, and installation guidelines.

C. Material Safety Data Sheets,

D. Product Liability Insurance, and

E. Safety requirements.

F. Evaluation of the roofing material's physical properties and performance characteristics as verified by an independent, accredited testing agency.

G. Installer's Certificate of Authorization, signed by manufacturer.

H. Roof Inspection Report, including details of special interest and any remedies proposed by manufacturer, its representative, or installer to address unusual requirements beyond the purview of this specification.

I. Review Project Contract, including installer's logistical requirements such as water and electrical access, material storage area, designated work areas for ground to roof delivery of materials, personnel, etc. Determine work parameters required for a timely, efficient installation with minimal effect on the facilities normal operations.

J. Provide a schedule estimating the project's expected completion date. Consider the possibility of a delay due to poor weather conditions or other external factors. Establish provisions for addressing primary waterproofing concerns in lieu of a completed installation when nearing the winter season.

1.05 Factory Mutual

A. Upon request, provide component materials which have been evaluated by Factory Mutual for flame-spread and are rated as Class "A" materials over metal substrates. (Flame spread must be in accordance with ASTM #E10887, Uniform Building Code test method 32-7)

1.06 Installation Parameters

A. Emergency spot repairs can be made in the winter or during inclement weather. However, extensive repairs or system installations should not be considered unless the following conditions are met:

1. Surface must be clean and dry prior to application of coatings.

2. Do not begin work if surface temperature is above 140 degrees Fahrenheit or below 40 degrees Fahrenheit, or when the dew point is less than 5 degrees Fahrenheit above the surface temperature.

3. Do not apply over silicone or PVC coatings. For questionable substrates, contact manufacturer's technical department.

4. Do not begin spray work if wind velocity is above 15 m.p.h.

1.07 Product Delivery, Storage, and Handling

A. Deliver only approved materials to the job site. Deliver materials in original sealed containers with seals unbroken and labels legible and intact.

B. Materials shall be delivered in sufficient quantities so as not to cause delays in work.

C. Store and handle materials in a manner which will ensure that there is no possibility of contamination. Store in a dry, well-ventilated, weather-tight place, at temperatures between 50 degrees and 80 degrees F. Do not stack pallets more than two (2) high. Do not subject existing roofing to unnecessary loading. In all cases, the storage and handling of materials shall conform to the requirements of the manufacturer and all applicable safety regulatory agencies.

D. Material containers shall not be removed from the job site until final completion and/or until so authorized by the owner. All waste materials and debris shall be cleaned up daily.

E. Any damaged materials or materials not conforming to the specified requirements shall be rejected by the owner. Rejected materials shall be immediately re-moved from the job site and replaced at no additional cost to the owner.

1.08 Equipment

A. Roof coatings are most effectively applied using airless spray systems. Conventional air atomized spray systems can be used, but over-spray and drift are more pronounced. Recommended Airless Spray Equipment, gasoline driven:

Graco GH 733	4050 psi and 3 gal/m capacity
Grace GH 533	3000 psi and 2 gal/m capacity
Magnum 4000	4000 psi and 3 gal/m capacity
Hydra Pro IV or equivalent.	3000 psi and 2 gal/m capacity

B. Use only approved, high pressure, static grounded, solvent- resistant spray hose with the following minimum inside diameters:

Maximum material hose length:

1. 50 ft. - 3/8" ID
2. 150 ft. - 1/2" ID

C. Spray tips - Reversible, self-cleaning tip with an orifice diameter of .025 to .031 with 10" fan pattern; a .035 tip is used when spraying the Brush Grade Seam Sealer.

D. Spray pressure - 3000 psi at pump and 1700 psi min. at spray gun.

PART TWO - PRODUCTS

2.01 Rubber Roof Coating

A. Rubber roof coating products physical specifications and minimum performance criteria shall be in accordance with the following schedules:

1. NEOPRENE FLASHING CEMENT

<u>TEST</u>	<u>ASTM</u>	<u>RESULT</u>
Elongation at 77 deg. F. ASTM D412	ASTM D412	400%
Recovery from 100% Elongation		100%
Tensile Strength ASTM D412	ASTM D412	600 psi Min.
ADHESIVE BOND Aluminum Q-Panels		
Method A D3359-90	D3359-90	5-highest rating
Method B D3359-90	D3359-90	5-highest rating
PLIABILITY @J 0 deg.F.-180 deg. bend		
D2823-90	D2823-90	
1 inch mandrel		no cracking or separation
1/4 inch mandrel		no cracking or separation
WATER VAPOR PERMEABILITY E96-80	E96-80	0.15 perms

2. BRUSH GRADE SEAM SEALER

<u>TEST</u>	<u>ASTM</u>	<u>RESULT</u>
Elongation @ 77 deg. F.	ASTM D412	600%
Elongation @ 32 deg. F.	ASTM D412	300 %
Recovery from 100% Elongation		100%
Tensile Strength	ASTM D412	1500 psi
Viscosity	ASTM D562	135-143 K.U.

3. RUBBER COATING

<u>TEST</u>	<u>ASTM</u>	<u>RESULT</u>
Dry film thickness @ 1 gal/100 sqft.		6 mils
Elongation @ 77 deg. F.	ASTM D412	600%
Elongation @ 32 deg. F.	ASTM D412	300%
Recovery from 100% Elongation		100%
Tensile Strength	ASTM D412	1500 psi
Shore A Hardness	ASTM D2240	70
Viscosity	ASTM D562	105-I 10 K.U.

2.02 Rust Remover And Conditioner

A. Rust remover compound shall be a safe, non-toxic, non-flammable formulation which effectively conditions rust. In addition to treating rust and corrosion, product shall remove oil and dirt and prepares the surface for coating.

TYPICAL PROPERTIES

Flash Point	None
Specific Gravity	1.10
Weight/Gallon	9.3 lbs.
pH, undiluted	1.8
Odor	Mild, not offensive
Freeze/Thaw Stability	Thaw at room-temp. and shake or stir
Spills	Flush to sewer
Coverage	300-400 sq.ft./gal.

2.03 Polyester Membrane

A. Reinforcing membrane shall be composed of warp knit, 100% polyester yarn fibers offering an excellent combination of high strength and elongation to accommodate unusual stress forces from thermal shock or building movement.

TYPICAL PROPERTIES

Tensile Strength	ASTM D1682	90 lbs. (41 kg.)
Elongation	ASTM D1682	45%
Trapezoid Tear Strength	ASTM D1117	22 lbs. (10 kg.)
Ball Burst Strength	ASTM D3787	180 lbs. (82 kg.)

2.04 Manufacturers

A. The following roof coating manufacturers have been approved for this project. No substitutions by secondary, indirect manufacturers will be allowed.

Truco, Inc.
4301 Train Avenue
Cleveland, OH 44113
(800) 227-4569

B. Other manufacturers requesting approval must submit acceptable information certifying that they are the direct manufacturer from raw material into the specified product and meet the performance criteria required.

PART THREE - EXECUTION

3.01 Preparation Of Substrate

A. Inspect Metal Deck to receive coatings. Determine if any panels, skylights, stacks, or other roof accessories are beyond restoration, or pose a safety concern for traffic on the roof during or after the installation. Remove and replace as necessary.

B. Treatment of Loose Seams, Flashings & Assorted Details: All large or excessive gaps between end laps, vertical seams, curb units, etc. must be closed or made flush with self-tapping screws. (Backer rod, foam strips or urethane foam may be used to pre-till voids larger than 1/4 inch)

C. Fasteners: Re-tighten existing fasteners. Remove defective fasteners and replace with over-sized fasteners. Add additional fasteners when necessary.

D. Apply rust remover & conditioner to all areas exhibiting corrosion using a hand pump/garden sprayer to the affected areas. Apply liberally to areas with severe rust. Allow a minimum of 45 minutes to elapse before power washing the roof. Roof areas with severe or systemic rust should be provided additional time for the rust remover to react. In such cases, whenever the roof slope is 4/12 or less, the rust remover should remain overnight for maximum effect.

E. Pressure Washing: Once the rust remover has reacted with the rusted area (A pronounced change in color can normally be detected), the roof should be power-washed with water to remove rust residue, dirt, and other debris. Recommended units will provide 3,000 psi capacity. Aged coatings should be tested for adhesive integrity by fitting an oscillating tip on to the gun assembly. (Simpson WaterBlaster or equivalent) This will increase the working pressure to remove caulks, asphaltic repairs, etc. that may otherwise be subject to future delamination under the roofing system.

F. Remaining asphalt patches should be scraped-off or otherwise removed during the power washing process.

G. Translucent Panels & Skylights: Two coats of clear rubber are to be applied to weathered skylights or translucent panels using either a brush or a low-nap roller. Each coat is to be applied at the rate of one-half gallon per square. Skylights are to be flashed-in according to specification (see below) Aged fiberglass panels with extreme UV degradation should be recommended for replacement. In any event, never treat translucent panels with white rubber coatings, as it poses a severe safety risk to subsequent traffic on the roof deck.

3.02 Application

A. Waterproofing Details: All flashings, including curbs, horizontal & vertical seams, stacks and penetrations and shall be flashed with brush grade seam sealer. Openings in excess of 1/8 of an inch shall be reinforced with polyester membrane. Trowel grade flashing cement may be substituted as a base for the fabric on any miscellaneous areas requiring a heavy, viscous material.

1. Vents, Stacks, & Assorted Penetrations: Apply trowel grade flashing cement as an adhesive coat, imbed polyester membrane, and topcoat using brush grade seam sealer. Be sure the repair extends for several inches on the horizontal and vertical portions of the repair.

2. Skylights: The perimeter of flush skylights shall be flashed with Skylights: brush grade seam sealer or trowel grade flashing cement as an adhesive coat. Imbed polyester fabric and topcoat with brush grade seam sealer.

3. Curb Units: All curb flashings shall be flashed with Super Seam Sealer and polyester membrane. Rough areas with residual asphalt should use trowel grade rubber as the adhesive coat. Embed polyester membrane and topcoat with brush grade seam sealer.

4. Ridge Caps: All voids in the ridge cap must be sealed using backer rod, foam blocks, or urethane foam, prior to application of brush grade seam sealer. Urethane foam which extends beyond the ridge cap can be shaved flush with a utility knife. However, open cells must be filled with trowel grade flashing cement. While still wet, embed polyester membrane into the trowel grade rubber and topcoat with brush grade seam sealer.

5. Fasteners: Encapsulate with a heavy dollop of brush grade seam sealer. Dry mill thickness should be sufficient to obscure the fastener head's outline upon inspection of the prep work.

6. Vertical Seams: All vertical seams must be sealed with brush grade seam sealer at the rate of 1 gallon per 70 linear feet. Reinforce with polyester membrane as necessary.

7. End Laps: All horizontal seams must be sealed using brush grade seam sealer at the rate of 1 gallon per 50 linear feet. Reinforce with polyester membrane as necessary.

8. Review Prep Work for insufficient mil thickness, fishmouths in the membrane, and other irregularities. Repair deficiencies and install additional materials wherever dry film thickness is below required levels.

Note: A minimum usage of 2/3 gallon brush grade seam sealer per roofing square is required.

B. Contact manufacturer's representative when prep work is nearing completion and schedule inspection so as to mitigate or eliminate any delays. Photos depicting prep work are required prior to proceeding with the field coating's installation.

C. Install First Coat of spray grade rubber coating at a rate of 1.5 gallons per 100 square feet. Spray the coating perpendicularly onto the substrate with spray-gun held 18" to 24" from the surface. Overlap the spray pattern a minimum of 25%.

D. After a minimum of 24 hours has elapsed apply a second coat of spray grade rubber coating at a rate of 1.5 gallons per 100 square feet.

E. Repair any defects and inspect the roof for insufficient dry mil thickness (less than 22 dry mils field, 45 dry mils on seams and flashing details)

F. Inform all parties directly concerned with the roof installation upon completion of the work and schedule final inspection with manufacturer's representative.