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SPEC NOTE: **HRS (Henry® Restoration System) Permax**® **3.0 HFO Spray Polyurethane Foam and Henry Pro-Grade® 988 Silicone Roof Coating for Existing Metal Roofs.** This specification is ideally suited for the protection and maintenance of existing coated and non-coated metal roofing including steel, aged galvanized steel, aluminum, and copper to extend the life of the roofing assembly. Although prepared in CSI three (3) part format, this specification should be adapted to suit the requirements of the individual project and be included as a separate section under Division 07 - Thermal and Moisture Protection.

SPEC NOTE: This guide specification is a reference for recommended installation procedures of the products/assembly described; formatted in accordance with the Construction Specifications Institute (CSI) Manual of Practice. It is the discretion of the project specification author to use the information within as a whole, or in part, to set a minimum standard of performance. Update “[project specific]” notes and coordinate as required. Use of General Contractor/installing Subcontractor identified accordingly; modify as required.

SPEC NOTE: This document includes Henry® Company notes to assist the architect/specification writer. A Henry Company “SPEC NOTE” will always immediately precede the text to which it is referring. The section serves as a guideline; modify to meet specific project requirements.

SPEC NOTE: Delete “SPEC NOTE” sections in the final copy of the specification.

SPEC NOTE: This specification is not intended for application over Kynar® or Hylar® coated metal roofs.

SPEC NOTE: If metal panel is previously coated contact Henry technical services at (800) 486-1278.

SPEC NOTE: Use extreme caution when applying and walking on coated surfaces. Coated surfaces are extremely slippery and can create a fall hazard resulting in injury or death.

SPEC NOTE: Coverage rates indicated in guide specifications DO NOT include material calculations for waste.

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**SECTION 07 01 50**

**COATED FOAMED ROOFING**

**GENERAL**

* 1. GENERAL REQUIREMENTS
		1. The General Conditions, Supplementary Conditions, Instructions to Bidders, and Division 01- General Requirements shall be read in conjunction with and govern this section.
		2. Read this Specification as a whole by all parties concerned. Each Section may contain more or less than the complete Work of any trade. The Contractor is solely responsible to make clear to the installing Subcontractor the extent of their Work.
	2. SUMMARY
		1. This Section includes requirements for supplying labor, materials, tools, and equipment to complete the Work as shown on the Drawings Architectural Division as specified herein including, but not limited to, the following:
			1. Spray Polyurethane Foam Primer
			2. Spray Polyurethane Foam
			3. Sealant
			4. Roof Coating
			5. Roof Granules (optional)
			6. Walkways (optional)

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SPEC NOTE: Edit Paragraph below to suit project requirements: Add Sections as applicable.

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* 1. RELATED REQUIREMENTS

* + 1. DIVISION 05 – Metals 05 30 00 – Metal Decking
		2. DIVISION 07 – Thermal and Moisture Protection Section 07 61 00 – Sheet Metal Roofing
		3. DIVISION 07 – Thermal and Moisture Protection Section 07 01 20 – Maintenance of Thermal Protection
		4. DIVISION 07 – Thermal and Moisture Protection Section 07 01 50.16 – Roof Maintenance Program
		5. DIVISION 07 – Thermal and Moisture Protection Section 07 01 50.19 – Preparation for Re-Roofing
		6. DIVISION 07 – Thermal and Moisture Protection Section 07 01 50.23 – Roof Removal
		7. DIVISION 07 – Thermal and Moisture Protection Section 07 01 50.81 – Roof Replacement
		8. DIVISION 07 – Thermal and Moisture Protection Section 07 01 50.91 – Roofing Restoration
		9. DIVISION 07 – Thermal and Moisture Protection Section 07 01 60 – Maintenance of Flashing and Sheet Metal
		10. DIVISION 07 – Thermal and Moisture Protection Section 07 01 90 – Maintenance of Joint Protection

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SPEC NOTE: Projects not referencing LEED delete Sections “1.03. K” and “1.05.D.4.e” as stated below.

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* + 1. DIVISION [project specific] - LEED Requirements Section [project specific] – [project specific].
	1. ALTERNATES
		1. Submit requests for alternates in accordance with Section [project specific].
		2. Materials not considered acceptable substitutions:
			1. Roof coatings such as acrylic, cementitious, ceramic filled or asphalt modified, urethanes, and Kraton based rubber materials.

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SPEC NOTE: Henry offers two spray foam densities. Select from the following and modify section below as required.

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* + 1. Materials must meet the following criteria:
			1. Spray polyurethane foam
				1. Nominal density in accordance with ASTM D1622: 3.0
				2. Intertek CCRR, certified to:

ICC-ES AC377

ASTM E108

ASTM E84

* + - * 1. Global warming regulations:

Does not contain CFCs, HCFCs or HFCs

Global warming potential (GWP): 1

* + - * 1. Flame Spread: < 75
			1. Roof coatings:
				1. Roof coating as a standalone assembly, and independent of existing roof membranes, must pass ASTM D7281 – Standard Test Method for Determining Water Migration Resistance Through Roof Membranes. Test reports indicating testing of roof coating applied over a roof membrane are not considered acceptable substitutions.
				2. NSF certified in accordance with Protocol P151: Health Effects from Rainwater Catchment System Components.
		1. Alternate submission format to include:
			1. Online certification listings:
				1. Spray polyurethane foam:

Intertek CCRR, certified to:

ICC-ES AC377

ASTM E108

ASTM E84

* + - * 1. Roof Coating

NSF

* + - 1. Evidence that alternate materials meet or exceed performance characteristics of product requirements and documentation from an approved independent testing laboratory certifying that the performance of the system including auxiliary components exceed the requirements of the local building code.
			2. Product Data:
				1. Spray Foam and Roof Coating Manufacturer’s guide specification.
				2. Spray Foam and Roof Coating Manufacturer’s complete set of technical data sheets for assembly.
				3. Energy Star listing.
			3. Certificates:
				1. Independent testing laboratory certification indicating roof coating meets ASTM D7281 as described in Section 1.04.C.
				2. NSF certified in accordance with Protocol P151: Health Effects from Rainwater Catchment System Components.
				3. Product certification that the assembly components are supplied and warranted by single source Spray Foam and Roof Coating Manufacturer.
				4. Statement that installing Subcontractor is authorized by Spray Foam and Roof Coating Manufacturer to complete Work as specified.
				5. LEED:

Health Declaration Product (HPD) Certificate

* + - 1. Warranty:
				1. Complete set of warranty verification documents as required by the Spray Foam and Roof Coating Manufacturer.
			2. References clearly indicating that the Spray Foam and Roof Coating Manufacturer have successfully completed projects of similar scope and nature on an annual basis for a minimum of ten (10) years.
		1. Submit requests for alternates to this specification a minimum of ten (10) working days prior to bid date. Include a list of twenty-five (25) projects executed over the past five (5) years.
		2. Acceptable alternates will be confirmed by addendum. Substitute materials not approved in writing prior to tender closing shall not be permitted for use on this project.
	1. REFERENCES
		1. American Society for Testing and Materials (ASTM):
			1. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
			2. ASTM C794: Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
			3. ASTM C1549: Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
			4. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
			5. ASTM D1623 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
			6. ASTM D2126 Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
			7. ASTM D2240 Standard Test Method for Rubber Property-Durometer Hardness.
			8. ASTM D2369 Standard Test Method for Volatile Content of Coatings.
			9. ASTM D471: Water Absorption
			10. ASTM D4799 Standard Practice for Accelerated Weathering Test Conditions and Procedures for Bituminous Materials (Fluorescent, UV, Water Spray, and Condensation Method).
			11. ASTM D6694: Specification for Liquid Applied Silicone Coating Used in Spray Polyurethane Foam Roof Systems.
			12. ASTM D7281 – Standard Test Method for Determining Water Migration Resistance Through Roof Membranes
			13. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings.
			14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials.
			15. ASTM E96: Water Vapor Transmission of Materials
			16. ASTM E1980: Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces Miami-Dade County Product Control NOA (Notice of Acceptance)
		2. National Sanitation Foundation (NSF):
			1. Protocol P151 Health Effects from Rainwater Catchment System Components
		3. US Green Building Council (USGBC), Leadership in Energy and Environmental Design (LEED)
	2. ADMINISTRATIVE REQUIREMENTS
		1. Pre-installation meetings:
			1. When required, and with prior notice, a Spray Foam and Roof Coating Manufacturer representative will meet with the necessary parties at the jobsite to review and discuss project conditions as it relates to the integrity of the assembly.
	3. SUBMITTALS
		1. Provide the following requested information in accordance with Section [project specific] Submittal Procedures.
		2. Action Submittals:
			1. Product Data:
				1. Spray Foam and Roof Coating Manufacturer’s guide specification.
				2. Spray Foam and Roof Coating Manufacturer’s complete set of technical data sheets.
				3. Spray Foam and Roof Coating Manufacturer’s complete set of guide detail drawings.
				4. LEED: Spray Foam and Roof Coating Manufacturer’s HPD or product certificate
				5. Energy Star listing.
			2. Certificates:
				1. Product certification that the assembly components are supplied and warranted by single source Spray Foam and Roof Coating Manufacturer.
				2. Statement that installing Subcontractor is authorized by Spray Foam and Roof Coating Manufacturer to complete Work as specified.
				3. Statement that installing Subcontractor is Spray Polyurethane Foam Alliance (SPFA) qualified applicator.
			3. Warranty:
				1. Complete set of warranty verification documents as required by the Spray Foam and Roof Coating Manufacturer.
	4. QUALITY ASSURANCE
		1. Single Source Responsibility:
			1. Obtain spray polyurethane foam and roof coating and auxiliary materials including primers, primary roof coating, fabric reinforcement, sealants, and adhesives from a single Spray Foam and Roof Coating Manufacturer regularly engaged in the manufacturing and supply of the specified products.
			2. Installing Subcontractor to verify product compliance with federal, state, and local regulations controlling use of Volatile Organic Compounds (VOC).
		2. Manufacturer Qualifications:
			1. Spray Foam and Roof Coating Manufacturer shall demonstrate qualifications to supply materials of this section by certifying the following:
				1. Spray Foam and Roof Coating Manufacturer must not issue warranties for terms longer than they have been manufacturing and supplying specified products for similar scope of Work.
		3. Installer Qualifications:
			1. Only authorized Subcontractor(s) shall install the spray polyurethane foam and roof coating.
			2. Perform Work in accordance with the Spray Foam and Roof Coating Manufacturer’s published literature and as specified in this section.
			3. Maintain one (1) copy of the Spray Foam and Roof Coating Manufacturer’s instructions on site.
			4. Allow the Spray Foam and Roof Coating Manufacturer representative site access during installation.
			5. Contact the Spray Foam and Roof Coating Manufacturer two weeks prior to scheduling a meeting.
	5. DELIVERY, STORAGE, AND HANDLING
		1. Delivery of Materials:
			1. Deliver materials to the jobsite in undamaged and clearly marked containers indicating the name of the Spray Foam and Roof Coating Manufacturer and product.
		2. Storage of Materials:
			1. Store materials as recommended by the Spray Foam and Roof Coating Manufacturer and conforming to applicable safety regulatory agencies. Refer to all applicable data including, but not limited to, MSDS sheets, Product Data sheets, product labels, and specific instructions for personal protection.
			2. Keep solvents away from open flame or excessive heat.
			3. Spray polyurethane foam and roof coating should be stored in closed containers.
			4. Refer to Spray Foam and Roof Coating Manufacturer’s published literature.
		3. Handling:
			1. Provide adequate ventilation for protection from hazardous fumes.
			2. Protect areas not included in scope of work from overspray.
			3. Refer to Spray Foam and Roof Coating Manufacturer’s published literature.
			4. Verify material onsite is applied within allowable shelf life.
	6. SITE CONDITIONS
		1. Environmental Requirements:
			1. Do not perform Work during rain or inclement weather.
			2. Do not perform Work on frost covered or wet surfaces.
		2. Protection:
			1. It is the responsibility of the installing Subcontractor to protect all surfaces not included in scope of Work from damage.
			2. Secure protective coverings against wind and vent area if used in conjunction with applications preventing collection and moisture.
			3. Post signs noting potential overspray hazard within 400ft (122 M) of applications.
			4. Turn off air-intake ventilation equipment to prevent fumes from entering building.
			5. Post no smoking signs as mandated by local fire ordinances.
		3. Complete preparation Work prior to installing roof coating and spray polyurethane foam.
		4. Ground all electrical equipment during operations.
	7. WARRANTY

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SPEC NOTE: Structural metal decks lighter than 22 gauge (0.03 inches) and sloped metal roof panels lighter than 29 gauge (0.014 inches) may be ineligible for Gold Seal Warranty issuance. Contact Henry prior to roof coating application.

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* + 1. Warranty Submittals to Spray Foam and Roof Coating Manufacturer:
			1. Contact Henry® sales representative for a complete list of required documents and procedures prior to material purchase. Warranties submitted without required documents and procedures completed may result in delay or rejection of warranty request.

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SPEC NOTE: Contact the local Henry representative to obtain a current sample warranty for further clarification.

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* + 1. Warranty Terms:
			1. Installing Contractor:
				1. Installing Subcontractor must warranty the installation; provide material and labor costs for repair in the event of a leak as a result of faulty workmanship for a period of two (2) years from the date of installation completion.
			2. Manufacturer's Single Source Warranty; choose from the following:
				1. Manufacturer’s Single Source Material Plus Warranty:

Installing Subcontractor must be a Material Plus Authorized Subcontractor.

Manufacturer must warranty the products; provide material and labor costs for repair for a period of [10 years] [15 years] [20 years] years from the date of installation completion as a result of any of the following:

Manufacturing product defect

* + - * 1. Manufacturer’s Single Source Gold Seal Warranty:

Installing Subcontractor must be a Gold Seal Authorized Subcontractor.

Manufacturer must warranty the products and installation; provide material and labor costs for repair for a period of [10 years] [15 years] [20 years] years from the date of installation completion as a result of any of the following:

Manufacturing product defect

Faulty workmanship

1. **PRODUCTS**
	1. MANUFACTURERS
		1. Obtain waterproofing and auxiliary materials as a single-source from the Spray Foam and Roof Coating Manufacturer to ensure total system compatibility and integrity.
		2. Acceptable Manufacturers:
			1. Henry Company

999 N. Pacific Coast Highway, Suite 800

El Segundo, CA 90245

(800) 486-1278

[www.henry.com](http://www.henry.com)

* 1. MATERIALS
		1. Spray polyurethane foam and roof coating assembly minimum requirements (Basis of Design):
			1. Spray polyurethane foam:
				1. Nominal density in accordance with ASTM D1622: 3.0
				2. Thermal Resistance Value (R-value): Minimum project specific
				3. Intertek CCRR, certified to:

ICC-ES AC377

ASTM E108

ASTM E84

* + - * 1. Global warming regulations:

Does not contain CFCs, HCFCs or HFCs

Global warming potential (GWP): 1

* + - * 1. Flame Spread: < 75
			1. Primary roof coating:
				1. Energy Performance:

Initial Solar Reflectance (ASTM C1549): 88%

Solar Reflective Index (SRI): 111

ENERGY STAR: Certified

* + - * 1. NSF certified:

Protocol P151: Health Effects from Rainwater Catchment System Components

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SPEC NOTE: Henryoffers two spray foam densities. Select from the following and modify section below as required.

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* + 1. Primary Products:
			- 1. Basis of design: Permax® 3.0 HFO
				2. Nominal Density (ASTM D1622): 3.0 lbs/ft³
				3. Compressive Strength (ASTM 1621): 48-52 psi
				4. Closed Cell Content: >90% minimum
				5. Aged Thermal Performance:

Thermal Conductance (ASTM C518): 0.150

Thermal Resistivity (ASTM C518): 6.54

* + - * 1. Tensile Strength (ASTM D1623): 90 psi
				2. Water Vapor Transmission (ASTM E96): 0.28 US Perms
				3. Water Absorption (ASTM D2842): 0.017 gm/cc

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SPEC NOTE: Contact Henry for additional roof coating color options. Product properties may vary.

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* + - 1. Primary Roof Coating:
				1. Solvent free one-component moisture curing silicone rubber roof coating, having the following properties:

Basis of design: Pro-Grade® 988 Silicone Roof Coating

Color: Bright White

Standard Test Method for Determining Water Migration Resistance Through Roof Membranes (ASTM D7281): Pass (>/= 22 dry mils)

Solids Content:

By volume (ASTM D2697): 92 +/-3%

Flash Point (ASTM D93): 140.9 degrees F (60.5 degrees C)

Tack-Free Time at 75 degrees F (24 degrees C): Approximately 1-2 hours

Volatile Organic Content (VOC) (ASTM D3960/EPA Method 24): 10g/l max.

Durometer Hardness, Shore A (ASTM D2240): 42 Shore A

Tensile Strength, die C (ASTM D412): 320psi

Elongation (ASTM D412): 170%

Permeability (ASTM E96): 4.6 perms

Initial Solar Reflectance (ASTM C1549): White roof coating: .88

Solar Reflective Index (SRI): 111

QUV, 5,000 hours (ASTM G154): No degradation

Water Absorption (ASTM D471): 0.0005%

* + - 1. Base Coat:
				1. Solvent free one-component moisture curing silicone rubber roof coating; having the following properties:

Basis of design: Pro-Grade 988 Silicone Roof Coating

Color: Bright White, Tan or Gray

Standard Test Method for Determining Water Migration Resistance Through Roof Membranes (ASTM D7281): Pass (>/= 22 dry mils)

Solids Content:

By volume (ASTM D2697): 92 +/-3%

Flash Point (ASTM D93): 140.9 degrees F (60.5 degrees C)

Tack-Free Time at 75 degrees F (24 degrees C): Approximately 1-2 hours

Volatile Organic Content (VOC) (ASTM D3960/EPA Method 24): 10g/l max.

Durometer Hardness, Shore A (ASTM D2240): 42 Shore A

Tensile Strength, die C (ASTM D412): 320psi

Elongation (ASTM D412): 170%

Permeability (ASTM E96): 4.6 perms

Initial Solar Reflectance (ASTM C1549): White roof coating: .88

Solar Reflective Index (SRI): 111

QUV, 5,000 hours (ASTM G154): No degradation

Water Absorption (ASTM D471): 0.0005%

* + 1. Assembly Auxiliary Materials:
			1. Spray Polyurethane Foam Primer:
				1. Acrylic based primer; having the following properties:

Basis of design: Acryprime - Substrate

Color: Dark Gray

* + - * 1. Acrylic based primer with a deep black color designed to raise the solar gain on the substrate for quicker drying, having the following properties:

Basis of design: Acryprime Substrate SG

Color: Black

* + - 1. Sealants:
				1. Butter grade, one-part moisture cure sealant consisting of silicone rubber; having the following properties:

Basis of design: Pro-Grade 923 Butter Grade Silicone Roof Sealer

Colors: White

Solids Content by Volume (ASTM D2697-3): 95%

Tensile Strength, die C (ASTM D412): 130 psi

Elongation (ASTM D412): 275%

Volatile Organic Content (VOC) (ASTM D3960/EPA Method 24): 25g/l max

* + - * 1. Standard grade, one- part moisture cure sealant consisting of silicone rubber; having the following properties:

Basis of design: Pro-Grade920 Silicone Roof Sealant

Colors: Bright White or Grey

Solids Content by Volume (ASTM D2697-3): 95%

Tack free time: Approximately 1-2 hours

Cure time (ASTM C920): 7 days

Tensile Strength, die C (ASTM D412): 200 psi

Elongation (ASTM D412): 300%

Volatile Organic Content (VOC) (ASTM D3960/EPA Method 24): 25g/l max

* + - * 1. Fibered grade, one-part moisture cure sealant consisting of silicone rubber; having the following properties:

Basis of design: Pro-Grade957 Silicone Fibered Roof Sealer

Colors: White

Solids Content by Volume (ASTM D2697-3): 95%

Tack Free Time: Approximately 1-3 hours

Cure time (ASTM C920):24-48 hours

Tensile Strength, die C (ASTM D412): 110 psi

Elongation (ASTM D412): 75%

Volatile Organic Content (VOC) (ASTM D3960/EPA Method 24): 25g/l max

* + - 1. Roof Granules:
				1. Ceramic coated roof granules, and having the following properties:

Basis of design: Permax Roof Granules

Color: White

Sieve Size: varies; refer to Spray Foam and Roof Coating Manufacturer published literature

* + 1. Additional Materials:
			1. Cleaner:
				1. Refer to Section 3.02. D. Surface Cleaning
			2. Edge Metal Primer:
				1. Contact Spray Foam and Roof Coating Manufacturer for a complete list of recommended products.
1. **EXECUTION**
	1. EXAMINATION
		1. Verify metal gauge thickness is in accordance with Roof Coating Manufacturer warranty requirements. See Section 1.11 Warranty.
		2. It is the installing Subcontractor’s responsibility to verify the substrate is dry and in accordance with Section 1.03 Related Requirements prior to installation of spray foam and roof coating. Commencement of the Work or any parts thereof, indicates installer acceptance of the substrate.
			1. Do not install roof coating over saturated insulation.

Do not install spray polyurethane foam and roof coating over saturated substrates.

* + 1. The installing Subcontractor must verify the following:
			1. Moisture detection survey:
				1. Visual inspection
		2. Adhesion Test:
			1. Not required.
		3. Verify existing substrate and assembly flashings are dry, leak-free, and in accordance with Spray Foam and Roof Coating Manufacturer’s published literature.
			1. Contact Spray Foam and Roof Coating Manufacturer prior to spray polyurethane foam and coating installation where substrates are irreparable and require cover board.

* + 1. Verify skylights, scuppers, gutters, penetrations, and structures located within area of Work are firmly secured and in good working condition prior to installation. Clean, repair, or replace to correct substrate deficiencies as required in accordance with Metal Roofing Manufacturer’s published literature to obtain a continuous and secure substrate in accordance with Spray Foam and Roof Coating Manufacturer’s published literature prior to installation of spray polyurethane foam and roof coating.
		2. Existing assembly must be continuous and secured prior to application of spray polyurethane foam and roof coating.
		3. Verify fastener integrity and retighten or replace as required to obtain secure fastener placement in accordance with Metal Roofing Manufacturer published literature. Stitch-fasten deflected metal panels together to ensure a continuous substrate eliminating gaps. Fasteners requiring replacement must use larger diameter fasteners than existing.
		4. Verify metal seams are tight and flush. Detail metal seams in accordance with Roof Coating Manufacturer published literature. Refer to section 3.03G Detailing/Flashing.
		5. Do not apply spray polyurethane foam and roof coating until substrate and environmental conditions are in accordance with Spray Foam and Roof Coating Manufacturer’s published literature.
		6. Previously coated areas:
			1. Contact Roof Coating Manufacturer’s technical support or local sales representative for previously coated examination procedures.
	1. PREPARATION
		1. Surfaces must be sound, dry, clean, and free of oil, grease, dirt, excess mortar, frost, laitance, loose and flaking particles, or other contaminants.
		2. Existing metal roof, insulation, and all substrates must be dry and in accordance with Spray Foam and Roof Coating Manufacturer’s published literature prior to installation of roof coating.
		3. Surface Cleaning:
			1. Confirm local ordinances and jurisdiction restrictions prior to selecting from the following cleaning methods.
			2. Clean and prepare existing metal roofing taking caution not to inject water into roofing substrate.
			3. Acceptable Methods of Cleaning
				1. Ferrous Metal:

Sandblast iron and steel surfaces that are not primed, shop painted, or otherwise protected in accordance with SSPC SP-6, “commercial Blast Cleaning” and the SPFA surface preparation guidelines.

* + - * 1. Non Ferrous Metal:

Pressure washer with greater than 2000psi.

Air lance with greater than 2000psi.

Etching detergent in conjunction with sprayer:

Allow etching detergent to stand for 5 minutes. Lightly scrub with stiff bristle broom and remove with power washer using 3 to 4ft (0.91 to 1.2m) arc pattern. Recommended equipment:

Hudson type agricultural sprayer with greater than 2000psi

Conventional pressure sprayer with greater than 2000psi

Airless sprayer with greater than 2000psi

* + - * 1. Algae, mildew, or fungus:

Treat with a tri-sodium phosphate (TSP) or equivalent non-filming detergent and water solution.

Clear water rinse until all cleaning residue is removed.

* + - * 1. All substrate areas must be completely dry prior to primer or coating application.
				2. Refer to Spray Foam and Roof Coating Manufacturer’s published literature.
		1. All areas must promote positive drainage.
			1. Contact Spray Foam and Roof Coating Manufacturer’s technical support or local sales representative for ponding area repair procedures.
		2. Repair, removal, and replacement of existing metal roofing:
			1. Replace metal panels compromising structural integrity including damaged, weakened, or corroded panels, fascia, gutters, vents, ridge caps, and flashings. Contact Metal Roofing Manufacturer for repair, removal, and replacement of compromised material.
			2. Remove rust with wire brush, sandblast, or mechanically abrade until substrate is smooth and rust free.
			3. Remove old and damaged mastic repairs at laps, seams, and fasteners.
		3. Fluted Decks:
			1. Fill fluted metal decks with spray polyurethane foam to eliminate voids prior to field application of spray polyurethane foam.
		4. Edge Metal:
			1. Fabricate and install twenty-four (24) gauge metal foam stop where required in accordance with Spray Foam and Roof Coating Manufacturer’s published literature.
			2. Etch and prime surfaces as recommended by Spray Foam and Roof Coating Manufacturer prior to installation of spray polyurethane foam and roof coating.
	1. INSTALLATION
		1. Verify substrate is ready to receive the spray polyurethane foam and roof coating in accordance with Spray Foam and Roof Coating Manufacturer’s TDS and guide specification.
		2. Roof coating may settle during storage. Mix roof coating prior to use with drill and mixer blade until consistent viscosity is achieved.
		3. Environmental Conditions:
			1. Do not apply primers, spray polyurethane foam, or roof coating when inclement weather conditions are predicted during the application and curing period.
			2. Temperature Limitations:
				1. Spray polyurethane foam:

Substrate temperature must be above 45 degrees F (7 degrees C) and rising and 6 degrees F (3 degrees C) above dew point temperature and rising.

* + - * 1. Roof Coating:

Substrate temperature must be above 35 degrees F (2 degrees C) and rising and at least 6 degrees F (3 degrees C) above the dew point temperature and rising.

* + - 1. Wind:
				1. Wind velocity shall not exceed 12-15 miles per hour.
		1. Limit spray polyurethane foam installation to areas where foam is coated by end of day in accordance with Spray Foam and Roof Coating Manufacturer published literature.
		2. Detailing/Flashing:
			1. Complete detailing and flashings prior spray polyurethane foam and roof coating installation.
			2. Install detailing and flashings per Spray Foam and Roof Coating Manufacturer’s published literature.
			3. Lap, seal, and fasten all joints in accordance with Metal Roofing Manufacturer, SPFA, and NRCA guidelines.
			4. Refer to Spray Foam and Roof Coating Manufacturer’s detail drawings for installation procedures including, but not limited to, the following:
				1. Equipment platform
				2. Expansion joints
				3. Parapets
				4. Penetrations
				5. Perimeter edge
				6. Roof curbs
				7. Roof drains
				8. Skylights
				9. Thru-Wall Scuppers
		3. Application of Spray Polyurethane Foam:
			1. Prime substrate in accordance with Spray Foam and Roof Coating Manufacturer published literature.
			2. Apply spray polyurethane foam in accordance with SPFA and NRCA guidelines.
			3. Apply spray polyurethane foam to promote positive drainage and at a minimum overall slope to comply with local ordinances.
				1. Slope at edge metal, roof drains, and scuppers:

Taper spray polyurethane foam at minimum 1/4 inch per foot (1:48) slope and a distance of up to three (3) feet from edge or drain outlet.

* + - 1. Lift thickness:
				1. Install spray polyurethane foam in accordance with SPFA guidelines
				2. Apply spray polyurethane foam to promote positive drainage.
				3. Field of roof:

Smooth surfaces:

Minimum one (1) inch thick

* + - * 1. Refer to Spray Foam and Roof Coating Manufacturer published literature.
			1. Surface Finish:
				1. Acceptable textures: Orange peel, coarse orange peel, verge of popcorn.
				2. Unacceptable textures: Popcorn and tree bark.
		1. Roof Marking:
			1. Mark desired area in accordance with published literature to apply the appropriate amount of roof coating per square. Re-measure prior to installation of second coat to ensure proper millage requirements.
			2. Contact Spray Foam and Roof Coating Manufacturer for roof marking instructions.
				1. Coverage rates are theoretical and do not take into account for material loss due to spraying, surface texture, waste, etc.
				2. Install a test patch to determine how much coating per square is required over asphaltic textured surfaces.
				3. Adjust application rates based on test patch results in order to meet specified requirements.
		2. Application of Roof Coating:
			1. Application rates apply to both Material Plus and Gold Seal Warranties.
			2. Refer to Roof Coating Manufacturer warranty chart for coverage rate options.

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SPEC NOTE: For added traction at areas anticipating periodic traffic due to roof maintenance and around mechanical equipment, install an additional layer of roof coating in accordance with “3.03.I Walkways”.

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* + 1. Walkways: (optional)
			1. Verify overall spray polyurethane foam and roof coating is in accordance with warranty requirements.
			2. Verify substrate is thoroughly clean and free of debris or contamination prior to subsequent application. Wash roof coating as required and allow roof coating to dry.
			3. Apply additional primary roof coating at traffic areas at a minimum one (1) gallon per square (Sixteen (16) wet mils).
			4. Apply granules uniformly into wet roof coating at a rate of 20-30 pounds per 100 square feet.
			5. Allow roof coating to dry.
			6. Remove loose particles to avoid clogging drains.
	1. FIELD QUALITY CONTROL
		1. Limit traffic on roof coated surfaces for a minimum of two (2) days. Damage to surface by other trades shall not be the responsibility of the installing Subcontractor.
		2. Final Observation and Verification:
			1. [Architect] [Consultant] [General Contractor] [Spray Foam and Roof Coating Manufacturer] to complete the final inspection of spray polyurethane foam and roof coating as required by warranty.
			2. Contact Spray Foam and Roof Coating Manufacturer for warranty issuance requirements.
	2. CLEANING
		1. As the Work proceeds, and upon completion, promptly clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
		2. Clean soiled surfaces, spatters, and damage caused by Work of this Section.
		3. Check area to ensure cleanliness and remove debris, equipment, and excess material from the site.

END OF SECTION