SPRAY POLURETHANE FOAM & COATING
Over Metal Roof Deck

SPF

To ensure warranty eligibility, each job must be approved by American WeatherStar before it begins.

PART 1 — GENERAL

1.01 DESCRIPTION

A. The intention of this guideline is to outline the procedures for the application of American WeatherStar's Spray Polyurethane Foam (SPF) and reflective roof coating system over a **Metal Roof Deck**. These suggested guidelines describe materials, methods and conditions necessary for the proper application of the American WeatherStar roof coating system. Actual application requirements may vary and are the responsibility of the contractor.

B. This guideline may not outline all procedures for preparation and finishing of penetrations, drains, flashings, etc. The contractor should outline this work separately before the work commences and shall be performed observing good trade practices.

1.02 APPROVED APPLICATOR

All American WeatherStar products shall be applied by a single, experienced and competent Approved Contractor or applicator approved by American WeatherStar.

PART 2 — PRODUCTS

2.01 CLOSED CELL POLYURETHANE FOAM

A. The polyurethane foam to be applied shall be a two-component system made by combining an isocyanate (A) component with a polyol (B) component and shall possess the following physical characteristics:

PROPERTIES	ASTM TEST	VALUE	UNITS
Density	D1622	2.8 – 3.0	lbs./ft3
Compressive Strength	D1621	40 psi, minimum	lbs./in2
Open Cell Content	D2856	90%, minimum	% value
K-Value	C177, C518, C1363	0.16 – 0.18	BTU per ft2/hr. Degree F per inch
Flammability	E84**	<75	

*This standard is used solely to measure and describe properties of products in response to heat and flame under controlled laboratory conditions. This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

B. Polyurethane Foam, along with elastomeric coating and/or other components as an assembly shall meet the requirements of UL 790 for a Class A application and/or meet the requirements of a Factory Mutual RoofNAV for a Class 1 application, and/or as required by local building codes.

C. Polyurethane Foam Primers: Primers used shall be as recommended by the manufacturer of the spray foam materials specified.

D. Fire Safety Requirements: See CPI Bulletin AX-230, “Fire Safety Guidelines for Use of Rigid Polyurethane and Polyisocyanate Foam Insulation in Building Construction.”

2.02 COATINGS AND RELATED MATERIALS

All materials used shall be manufactured by and or approved by American WeatherStar and shall meet the following specifications.

2.03 ELASTOMERIC COATING PRODUCTS

ACRYLIC 211
Type: Solar reflective coating
Viscosity: 4,500 ± 500 cps
Elongation: 225%
Tensile strength: 225 psi
Volume solids: 58% ± 1%
Color: White, gray, and tan standard – custom colors available

SILICONE 410
Type: UV resistant elastomeric
Viscosity: 9,000 cps
Elongation: 267% at 73°F ± 20%
Tensile strength: 486 psi at 73°F ± 20 psi
Volume solids: 69% ± 2%
Color: White, gray, and tan

HIGH SOLIDS SILICONE 412
Type: UV resistant elastomeric
Elongation: >192% at 73°F
Tensile strength: 331 psi at 73°F
Volume solids: 96% ± 2%
Color: White, gray, and tan

ALIPHATIC URETHANE 510
Type: Single component moisture cure urethane
Viscosity: 3,000 cps
Elongation: 350% ± 50%
Tensile strength: 1100 ± 25 psi
Volume solids: 74% ± 2%
Color: Bright white

AROMATIC URETHANE 520
Type: Single component moisture cure urethane
Viscosity: 2,000 cps
Elongation: 350% ± 50%
Tensile strength: 975 ± 25 psi
Volume solids: 70% ± 2%
Color: Silver

PURE POLYUREA 550
Type: Two component pure polyurea
Elongation: 650% ± 10%
Tensile strength: 2,840 ± 100 psi
Volume solids: 100%
Color: Light gray

2.04 WARRANTY

A. American WeatherStar warrants that the material supplied will meet or exceed physical properties as published. The contractor guarantees that workmanship will be free of defects in coating application. Since performance of existing roof substrate or previously applied coatings are beyond the control of American WeatherStar or the contractor, requests for additional warranty coverage shall be subject to prior approval by American WeatherStar.

B. Comply with manufacturer’s warranty application procedures. A Pre-Project Inspection Report must be submitted and approved prior to job commencement.

2.05 QUALITY ASSURANCE

A. Contractor Qualifications: The proposed contractor should provide information concerning projects similar in nature to the one proposed including location and person to be contacted. Some manufacturers of sprayed polyurethane foam systems and/or protective coatings have approval programs and/or licensing methods that could be required.

B. Manufacturer Qualifications: Polyurethane foam and protective coating manufacturers shall show evidence of sufficient financial resources and manufacturing facilities to furnish materials on this project. References shall be required, sufficient project lists, warranties and code approvals shall be submitted for verification.

C. Inspections: The polyurethane foam and protective coating manufacturers are to provide qualified representatives to monitor and inspect the installation of their products, as they require. Third party inspection of the installation is recommended. A list of SPFA inspector members is available.

2.06 SUBMITTALS

A. Manufacturers published data sheets or letter of certification that their products comply with the materials specified and intended for use on this project. This is to include primers (if required), polyurethane foam, protective coatings and accessories (if required).

B. Shop drawings on sheet metal, accessories, or other fabricated items.

C. Manufacturer's application or installation instructions.

D. Contractor/applicator certification from polyurethane foam supplier and/or protective coatings manufacturers and evidence of contractor/applicator qualification and experience.

E. A specimen copy of the applicable warranty for the project.

F. Approval and information guides for applicable local, state or national codes and/or insurance acceptability, if required.

G. Safety and handling instructions for storage, handling and use of the materials to include appropriate Safety Data Sheets (SDS).

H. Field Quality Control Procedures to be utilized by the contractor/applicator to insure proper preparation and installation of polyurethane foam and protective coatings, detail work and follow-up inspection.

2.07 MATERIALS, DELIVERY AND STORAGE

A. Materials shall be delivered in the manufacturers' original, tightly sealed containers or unopened packages, all clearly labeled with the manufacturer's name, product identification, safety information, and batch or lot numbers where appropriate. Where materials are covered by a referenced specification, the labels shall bear the specification number, type and class, as applicable. All materials must be the same product number and name as those submitted.

B. Containers shall be stored out of the weather and direct sunshine where the temperatures are within the limits specified by the manufacturer.

C. All materials shall be stored in compliance with local fire and safety requirements.

2.08 ENVIRONMENTAL CONDITIONS

A. The polyurethane foam applications shall not proceed during periods of inclement weather. Do not apply the polyurethane foam below the temperature and/or above humidity specified by the manufacturer for ambient air and substrate.

B. Do not apply protective coatings when there is ice, frost, surface moisture or visible dampness present on the surface to be coated. Apply protective coatings in accordance with the coatings manufacturer's application instructions for environmental conditions.

C. Wind barriers may be used if wind conditions could affect the quality of the polyurethane foam or protective coating installation.

2.09 SAFETY REQUIREMENTS

A. See CPI Bulletin AX-205, “Working with MDI and Polymeric MDI: What You Should Know.”

B. Refer to appropriate Safety Data Sheets (SDS) for additional safety information.

C. Protection of building, grounds and occupants: All surfaces not to receive system specified shall be protected from overspray hazard, i.e. windows, doors, exterior and vehicles. Seal off air entry points into the building, as necessary, where odor may adversely affect inhabitants. Post “Spray Hazard Signs” in accordance with General OSHA Standards.

2.10 ACCESSORIES AND MISCELLANEOUS MATERIALS

A. Flashings and waterproof coverings for expansion joints shall be compatible with specified polyurethane foam and elastomeric coating system and shall be as recommended by the manufacturers of the systems specified.

B. Miscellaneous materials such as adhesives, elastomeric caulking compounds, metal, vents and drains shall be a composite part of the roof system and shall be those recommended by the systems manufacturer.

C. Granules (Mandatory for systems L&M Warranty): When applicable, shall be applied in the top coat using the size, type, and coverage as recommended by the coating manufacturer.

D. Board stock: If required over metal decks, fasten to achieve necessary wind uplift requirements.

PART 3 — INSTALLATION

3.01 GENERAL

Guidelines as outlined by American WeatherStar, the manufacturer issuing the warranty, shall be the final specification authority.

3.02 SURFACE PREPARATION

A. Metal Deck

1. The metal roof deck shall be constructed of minimum 22-gauge steel. Construction shall conform to local building codes.
2. Ferrous Metal: Sandblast iron and steel surfaces which are not primed, shop painted, or otherwise protected in accordance with SSPC SP-6, Commercial Blast Cleaning. Remove loose rust and unsound primer from shop-primed iron and steel surfaces by scraping or wire brushing.
3. Non-Ferrous Metal: Clean and/or prime galvanized metal, aluminum, and stainless steel surfaces as recommended by the manufacturer issuing the warranty.
4. If the metal surface is free of loose scale, rust, weathered or chalking paint, it can be cleaned using compressed air jet, vacuum equipment, and hand or power broom to remove loose dirt. Grease, oil or other contaminants shall be removed with proper cleaning solutions.
5. Fluted metal decks require a suitable method of covering or filling the flutes prior to polyurethane foam application. Flutes may be covered with mechanically fastened rigid board stock, open weave mesh reinforcing fabric, filled with precut board stock or spray applied polyurethane foam.

B. Other Surfaces (i.e. gypsum board, polyisocyanurate board)

1. These materials are generally used over fluted metal decks and must be fastened to achieve necessary wind uplift requirements.
2. Boards shall be firmly butted together along all edges without gaps or openings. Joints exceeding 1/4 inch shall be caulked with a suitable sealant material.
3. Special care must be taken to prevent these materials from getting wet in storage on the job site and after installation prior to being protected by polyurethane foam. Moisture exposure will damage these materials and may be a cause for replacement.
4. Remove loose dirt and debris by using compressed air, vacuum or light brooming. No power brooming is permitted due to possibility of damage.
5. The installed materials shall be protected from spills of contaminants such as oil, grease, solvents, etc., as these materials cause soiling that cannot be readily removed from the board surfaces.

3.03 PRIMER APPLICATION

A. Examine substrates to receive primers. Do not proceed with installation of the spray foam until all problem areas have been corrected in a manner acceptable to the manufacturer.

B. Appropriate primer shall be as specified and/or at direction of the spray foam manufacturer.

3.04 POLYURETHANE FOAM APPLICATION

A. Inspection and Testing

1. Prior to application of the foam, the surface shall be inspected to insure conditions required by the manufacturer have been met.
2. An adhesion test should be conducted to ensure proper adhesion to the existing substrate.

NOTE: Adhesion to the existing roof substrate depends on the condition of current substrate or any existing coating.

B. Application

1. The spray polyurethane foam shall be applied in accordance with the manufacturer's specification and instructions.
2. Areas to be built-up to remove ponding water are to be filled in with spray polyurethane foam before the specified thickness of polyurethane foam is applied to the entire roof surface.
3. The spray polyurethane foam must be applied in a minimal pass thickness of 1/2 inch.
4. Spray polyurethane foam thickness shall be a minimum of one inch (a minimum of 1 ½" if spraying direct to metal panel less than 22 gauge, or more if specified). The polyurethane foam shall be applied uniformly over the entire surface with a tolerance of plus 1/4" per inch of thickness minus 0", except where variations are required to insure proper drainage or to complete a feathered edge. Also, foam thickness specifications are based on individual substrates waterproofed. Contact American WeatherStar for more information.
5. The spray polyurethane foam shall be uniformly terminated a minimum of eight (8) inches above the roofline at all penetrations (except drains, parapet walls, or building junctions). Foamed in place cants shall be smooth and uniform to allow positive drainage.
6. When detailing skylights or high walls, it is particularly important not to cover weep holes with SPF or coating.
7. Substrate shall have sufficient slope to eliminate excessive ponding water. Ponding is defined as "The accumulation of water in low-lying areas that exceeds the manufacturer's specification and/or contract documents." If the substrate does not have sufficient slope, then the ponding water must be eliminated by building in slope by the application of polyurethane foam, channeling the polyurethane foam or by the proper placement of drains, or a combination thereof.
8. The full thickness of polyurethane foam in any area shall be completed prior to the end of each day. If due to weather conditions more than 24 hours' elapse between polyurethane foam and coating application, the polyurethane foam shall be inspected for UV degradation, oxidation or contamination. If any of the above conditions exist, the surface shall be prepared in conformity with the recommendations of the manufacturer issuing the warranty.

C. Surface Finish

1. The final sprayed polyurethane foam surface shall be "smooth, orange peel, coarse orange peel, or verge of popcorn." Polyurethane foam surfaces termed "popcorn" or "tree bark" are not acceptable. These areas shall be removed and re-foamed to an acceptable surface.
2. Any damage or defects to the polyurethane foam surface shall be repaired prior to the protective coating application.
3. The polyurethane foam surface shall be free of moisture, frost, dust, debris, oils, tars, grease or other materials that will impair adhesion of the protective coating.

3.05 PROTECTIVE COATING APPLICATION

A. Inspection

1. Prior to the application of the protective coating the polyurethane foam shall be inspected for suitability of base coat application as per manufacturers' requirements.

B. Application

1. Base Coat
   a. The base coat shall be applied the same day as the polyurethane foam application when possible. In no case shall less than two hours' elapse between application of the polyurethane foam and application of the base coat. If more than 24 hours' elapse prior to the application of base coat, the polyurethane foam shall be inspected for UV degradation.

b. The polyurethane foam shall be free of dust, dirt, contaminants and moisture before application of the base coat. The polyurethane foam shall be clean, dry, and sound.

c. The base coat shall be applied at a uniform thickness with the rate of application being governed by the polyurethane foam surface texture. Coatings shall be applied at such a rate as to give the minimum dry film thickness specified by the protective coating manufacturer.

d. The coating shall be allowed to cure and be inspected for pinholes, thinly coated areas, uncured areas or other defects. Any defects should be repaired prior to subsequent applications. The base coat shall be free of dirt, dust, water, or other contaminants before application of the top coat.

e. The coating application shall not proceed during periods of inclement weather. The applicator shall not apply the protective coating below the temperature and/or above the humidity specified by the manufacturer for ambient air and substrate. Wind barriers may be used if wind conditions could affect the quality of installation.

2. Top Coat and/or Subsequent Coat

a. Application - Subsequent coating should be applied in a timely manner to insure proper adhesion between coats. Surface texture of polyurethane foam will affect dry film thickness—additional material may be required in areas of coarse foam profile.

b. Inspection - The cured dry film thickness of the finished multiple coat application shall be checked by taking slit samples and examining under magnification. Areas that are found to have less than the thickness specified shall require additional coating.

3.06 APPLICATION RATES

A. **10 Year System Requirement (30 mil Acrylic System)**

1. **BASE COAT:** Apply base coat of **ACRYLIC 211** roof coating at a rate of 1.25 gallons per 100 square feet.
2. **INTERMEDIATE COAT:** Apply base coat of **ACRYLIC 211** roof coating at a rate of 1.25 gallons per 100 square feet.
3. **TOP COAT:** Apply a top coat of **ACRYLIC 211** roof coating at a rate of 1.25 gallons per 100 square feet.
4. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 sq. ft. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

B. **10 Year System Requirement (25 mil Silicone System)**

1. **BASE COAT:** Apply base coat of **SILICONE 410** roof coating at a rate of 1.25 gallons per 100 square feet.
2. **TOP COAT:** Apply a top coat of **SILICONE 410** roof coating at a rate of 1.25 gallons per 100 square feet.
3. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 sq. ft. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

C. **15 Year System Requirement (30 mil Silicone System)**

1. **BASE COAT:** Apply base coat of **SILICONE 410** roof coating at a rate of 1.50 gallons per 100 square feet.
2. **TOP COAT:** Apply a top coat of **SILICONE 410** roof coating at a rate of 1.50 gallons per 100 square feet.
3. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 sq. ft. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

D. **10 Year System Requirement (30 mil Envir-O-Sil System)**

1. **BASE COAT:** Apply base coat of **HIGH SOLIDS SILICONE 412** roof coating at a rate of 1 gallon per 100 square feet.
2. **TOP COAT:** Apply a top coat of **HIGH SOLIDS SILICONE 412** roof coating at a rate of 1 gallon per 100 square feet.
3. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 sq. ft. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

E. **15 Year System Requirement (36 mil Envir-O-Sil System)**

1. **BASE COAT:** Apply base coat of **HIGH SOLIDS SILICONE 412** roof coating at a rate of 1.2 gallons per 100 square feet.
2. **TOP COAT:** Apply a top coat of **HIGH SOLIDS SILICONE 412** roof coating at a rate of 1.2 gallons per 100 square feet.
3. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 sq. ft. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

F. **10 Year System Requirement (30 mil Urethane System)**

1. **BASE COAT:** Apply base coat of **AROMATIC URETHANE 520** roof coating at a rate of 1.5 gallons per 100 square feet.
2. **TOP COAT:** Apply a top coat of **AROMATIC URETHANE 520** roof coating at a rate of 1.5 gallons per 100 square feet.
3. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30
4. lbs. per 100 square feet. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

G. **15 Year System Requirement (38 mil Hybrid Urethane System)**

1. **BASE COAT:** Apply base coat of **AROMATIC URETHANE 520** roof coating at a rate of 1.25 gallons per 100 square feet.
2. **INTERMEDIATE COAT:** Apply base coat of **AROMATIC URETHANE 520** roof coating at a rate of 1.25 gallons per 100 square feet.
3. **TOP COAT:** Apply a top coat of **ALIPHATIC URETHANE 510** roof coating at a rate of 1.25 gallons per 100 square feet.
4. **GRANULES:** Immediately broadcast roofing granules into finish coat at the rate of 30 lbs. per 100 square feet. (MANDATORY FOR AWS LABOR AND MATERIAL WARRANTY)

H. Each coat must be allowed to dry for 24-48 hours depending on humidity and temperature. The roof is to be inspected for defects, flaws or holidays and repaired if necessary.

I. Each contactor should estimate coating requirements based on actual experience and needs to figure in losses due to applicator experience, surface texture, wind, waste, and other factors that can affect actual gallons required.

J. It is the applicator's responsibility to verify wet and dry mil thickness during the application process to ensure proper dry mil thickness of the total roofing system.

3.07 WALKWAYS

Walkways may be installed for heavy traffic areas and around frequently serviced roof top units.

3.08 PONDING

A. Known ponding water areas are to be repaired using commonly acceptable roofing practices so as to allow proper drainage of roof area.

B. Ponding water areas are a sign of possible mechanical failure in the roof. Water is to be intentionally diverted from ponding areas using accepted roofing practices. Ponded areas which evaporate within 7 days (under 1/2" deep) can be top coated with an approved American WeatherStar coating at the application rate listed in below:

1. Acrylic System: Apply **SILICONE 410** at a rate of 2 gallons per 100 square feet to increase water resistance.
2. Urethane Systems: (3.06 F) Apply **AROMATIC URETHANE 520** or (3.06 G) **ALIPHATIC URETHANE 510** at a rate of 2 gallons per 100 square feet to increase water resistance.

C. The appropriate coating is to be extended 2 feet beyond the ponded area.

3.09 RESTRICTIONS / LIMITATIONS

A. This system is to be used only in conjunction with commonly accepted roofing standards but not limited to the following:

B. No application of materials shall commence during inclement weather or when precipitation is imminent.

C. No materials are to be applied to wet, dirty, or frozen surfaces.

D. In conjunction with the final inspection, all debris, containers, materials and equipment are to be properly removed from the job site. Grounds are to be cleaned, undamaged, and acceptable to the owner.

E. Reflectivity of coatings may be reduced if roof surface is not cleaned on a regularly scheduled basis.

CAUTION: Do not apply within two hours of sunset, rain, fog or freezing temperatures. The American WeatherStar roof coating system must be completely dry before exposing to water or foot traffic. Keep American WeatherStar containers covered when not in use. Dispose of all containers in accordance with state and local environmental regulations. Keep away from children. If ingested, DO NOT induce vomiting. Call Physician immediately.