

07 57 13 Sprayed Polyurethane Foam Roofing

Foam-LOK™ LPA 2800 4G Sprayed Polyurethane Foam with THERMO-SIL 9600 Pro Silicone Elastomeric Coating

PART 1 - GENERAL

1.1 SUMMARY

A. This document discusses the application of a liquid-applied elastomeric coating to serve as a protective coating over Foam-LOK sprayed polyurethane foam as part of a roofing system.

B. PRIMER:

The primers shall be Huntsman Building Solutions Thermo-Prime™, manufactured by Huntsman Building Solutions.

C. SPRAYED POLYURETHANE FOAM:

The polyurethane foam material shall be Huntsman Building Solutions Foam-LOK 2.8 lb. 4G. density spray polyurethane, as manufactured by Huntsman Building Solutions.

D. COATING:

The silicone elastomeric roof coating shall be THERMO-SIL 9600 Pro Series silicone resin coating uniquely formulated for the protection of sprayed-in-place polyurethane foam roofing systems.

1.3 QUALITY ASSURANCE

- A. Contractor Qualifications: The contractor should provide information concerning projects similar in nature to the one proposed, including location and person to be contacted.
- B. Qualifications of applicator: Applicator of fluid-applied spray polyurethane foam roofing shall have at least three years of successful installations of polyurethane foam.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original sealed containers, clearly marked with the manufacturer's name, brand name, and product identification, type of material, safety information, manufacture date, and lot numbers.
- B. Store materials in an area protected from the weather and direct sunlight, where temperatures will not be less than 65°F or more than 85°F.
- C. All materials shall be stored in compliance with local safety requirements.

1.5 SITE CONDITIONS

- A. Install all materials in strict accordance with all published safety, weather, and temperature precautions given by the manufacturer.
- B. Do not apply elastomeric coatings at temperatures below 50°F or when there is a possibility of temperatures falling below 32°F within a 24-hour period. Do not apply if weather conditions will not permit complete cure before rain, dew, fog, or freezing temperatures.
- C. Do not apply polyurethane foam at temperatures below 50°F or above 120°F, or when wind velocities exceed 12 mph. Do not apply if weather conditions will not permit complete cure before rain, dew, fog, or freezing temperatures.

1.6 SAFETY REQUIREMENTS

- A. All personnel spraying coating materials in exterior applications must wear acceptable organic respirators or other protective equipment to always ensure good

safety precautions. Contractor shall perform all work in accordance with OSHA regulations and safety regulations governing the location of the jobsite.

- B. Proper disposal of waste materials and containers must be done in compliance with federal, state, and local regulatory agencies.

PART 2 - PRODUCTS

2.1 OWNER-SUPPLIED PRODUCTS

- A. Provide Spray Polyurethane Foam manufactured by Huntsman Building Solutions 3315 E. Division Street, Arlington Texas, 76011. Tel: 818.640.4900, 888.224.1533
- B. Provide THERMO-SIL 9600 Pro Series silicone resin Coating by Huntsman Building Solutions, Inc. 3315 E. Division Street, Arlington Texas, 76011. Tel: 818.640.4900, 888.224.1533
- C. Provide Thermo-Prime acrylic primer by Huntsman Building Solutions, Inc. 3315 E. Division Street, Arlington Texas, 76011. Tel: 818.640.4900, 888.224.1533
- D. Submit requests for substitutions in accordance with provisions of Section 01600.

2.2 PRIMERS

- A. Thermo-Prime Acrylic Roof Primer™ is a single component, water soluble, acrylic primer that promotes adhesion of spray-in-place polyurethane foam to a variety of roofing substrates including BUR, modified bitumen, concrete, masonry, galvanized metal, and wood.

2.3 SPRAY POLYURETHANE FOAM

- A. Foam-LOK™ is a two-component, closed-cell, polyurethane foam system specifically designed to provide a high performance, light weight roofing system for use over a wide variety of roof deck construction and configurations.

Spray polyurethane foam roofing systems shall conform to the following minimum physical properties:

Foam-LOK 2.8 lb. Density Roofing Foam

Properties	Test Method/Requirements	Value
Aged "R" Value:	ASTM C-518	6.8 per inch
Compressive Strength:	ASTM D-1621 40 min.	45 -55 psi
Core Density:	ASTM D-1622	2.7-2.9 lbs./ft ³
Closed Cell Content:	ASTM D-2856 90 min.	>90%
Tensile Strength:	ASTM D-1623 60 min.	75 - 85 psi
Water Absorption:	ASTM D-2842 (1.0 max per volume)	.44
Water Vapor Permeability @ 74°F, perm inch:	ASTM E-96 2.5 max	1.1 @ 1"
Dimensional Stability: 28 days at 158°F, 98%RH	ASTM D-2126	1.20 % change in volume

Credentials/Certifications

- ICC ESR-3916
- Underwriters Laboratories Inc. File R14353
- Complies with ASTM C1029 for Type III Classification
- ASTM E-84 @ 4":

Flame Spread Index ≤10

Smoke Development ≤500

Dade County Approval

- NOA#18-0807.15 LT. WT. Concrete
 - NOA#18-0807.18 Concrete
 - NOA#18-0807.19 Recover
 - NOA#18-0807.20 Steel
 - NOA#18-0807.21 Wood
 - NOA#18-0807.16 Cementitious Wood Fiber
 - NOA#18-0807.17 Gypsum
- California Bureau of Home Furnishings and Thermal Insulation Reg. NO. CA-T444 (TX)

ELASTOMERIC COATING:

A. Thermo-Sil Pro™ 9600 Series High Solids Silicone Roof Coating is a single-component, moisture curing silicone rubber roof coating system designed for use on existing smooth surface BUR, granulated cap sheet, well-adhered acrylic coating, concrete, metal, sprayed-in place polyurethane foam and various single-ply membrane roofing. Thermo-Sil Pro™ 9600 Series High Solids Silicone Roof Coating is designed to withstand the damp heat and ultra-violet rays of humid environments.

Thermo-Sil Pro™ 9600 Series High Solids Silicone Roof Coating is used as a protective coating over polyurethane foam

THERMO-SIL 9600 Pro

Properties: Test Method/	Requirements	Value
Standard Colors:		TS 2201 – White TS 2202 – Tan TS 2203 – Light Gray
Solids by Volume:	ASTM D 2697	97% +/-3%
Tensile Strength:	ASTM D 2370	>240 psi @ 73°F
Elongation:	ASTM D 2370	>237% @ 73°F
Permeability	ASTM E-96	3.4 (Method B)
Theoretic Coverage		22 dry mils @ 1.5 gallon
VOC:		< 50 grams per liter
Flashpoint		>100°F
Tear Resistance	ASTM D 624	>23 lbf/in @ 73°F

2.5 SUBSTITUTIONS

- A. Fluid-applied waterproofing materials such as cementitious coatings, asphaltic coatings, Hypalon's, and butyls are not acceptable substitutes for materials specified herein.

PART 3 - EXECUTION

3.1 INSTALLERS

. Comply with the instructions and recommendations of the roofing system manufacturer.

B. Familiarize all installers with correct and safe application and handling procedures: 1.

See SPFA

Bulletin AX- 119, "MDI-Based Polyurethane Foam Systems: Guidelines for Safe Handling and Disposal." 2. Refer to appropriate Materials Safety Data Sheets (MSDS) for additional safety information.

C. Before starting to apply foam or coating, shut off all HVAC equipment on the roof and seal air

intakes and exhausts. Seal other potential sources of air entry into the building.

3.2 SURFACE PREPARATION - GENERAL

A. Any roof deck that is to receive sprayed polyurethane foam shall be securely fastened to the building structure.

B. Remove any contaminants that will interfere with total adhesion of the sprayed polyurethane to the substrate. Surface shall be free of loose particles, rust, scale, grease, dirt, laitance, or other contaminants.

C. Priming of substrate may be required.

3.3 SURFACE PREPARATION - CONCRETE

A. Concrete surfaces must be free of form oil or form release agents.

B. Excessive grease or oil other than form oil must be removed by use of a proper chemical solvent. Other loose dirt or contaminants may be removed by use of air jet, vacuum equipment, hand, or power broom. Washing with tri-sodium phosphate solution may be employed if deck is dry prior to application of sprayed polyurethane foam.

C. Taping may be required prior to application of sprayed polyurethane foam if joint opening between matching panels of concrete beams exceeds 1/4". Taping is optional, depending on thickness of foam sprayed-in-place.

- D. If matching edges of precast or prestressed panels are offset more than 1/2" special treatment of such a joint may be required.

Lightweight concrete fill shall be generally smooth and sufficiently dense when cured to provide a firm hard surface. Loose granular finishes are not acceptable.

- F. Prime with Thermo-Prime at the rate of one gallon per 400 square feet.

3.4 SURFACE PREPARATION - METAL

- A. If free of rust or loose scale, surface may be cleaned by use of air jet, vacuum equipment, hand, or power broom to remove loose dirt.
- B. Grease, oil, or other obvious contaminants must be removed by a proper chemical solvent.
- C. Metal surfaces having loose scale or rust must be cleaned in accordance with Steel Structure Painting Council Bulletin SP63 Commercial Blast Cleaning.
- D. Priming of substrate is optional. Prime all metal substrates with Thermo-Prime at the rate of one gallon per 400 sq. ft. if required.
- E. A thermal barrier may be required under the foam insulation to satisfy insurance or code requirements. Refer to specific local codes. If deemed necessary, add the following: *
 1. Steel decks shall have one layer of 1/2" thick type X gypsum board thermal barrier attached prior to the application of the foam insulation. All gypsum boards shall be mechanically fastened to the metal roof deck.
 2. Fasteners shall be Dekfast #14's, 1 1/4" and coated with corrosion inhibitors. All fasteners are to be installed with a 2-3-inch steel, 26-gauge, galvanized plate. Minimum fastening pattern shall be one fastener and plate every four-square feet. For a list of approved mechanical fasteners, see the latest edition of the Factory Mutual Approval Guide. Apply in pattern and spacing appropriate to materials and fasteners used as recommended by the manufacturer.

NOTE: *The use of a high tensile mastic tape over the metal flutes may be acceptable if insurance or code requirements do not prevail.

SURFACE PREPARATION - EXISTING ASPHALT OR COAL TAR BUILT-UP ROOF SYSTEMS

- A. Remove all existing non-embedded gravel or slag surfacing material by means of stiff bristle street brooms or powered mechanical sweepers. Gravel or slag materials shall be hauled from the job site. Suitable trash chutes shall be used to convey existing roofing materials from roof level to ground.
- B. Roof shall be examined for areas where cold application materials may have been applied. Where these materials are present in excessive amounts, such as puddles or mounds, these materials shall be removed down to the existing roofing felts.
- C. Remove dirt and dust from existing roof surface by means of air jet or power vacuum. No washing will be permitted without prior approval. A broomed clean surface is acceptable.
- D. Cut and repair all blisters and water saturated areas prior to application of sprayed polyurethane foam.
- E. The existing roof shall be examined for spongy insulation and/or water saturation. Depending upon conditions revealed by inspection, such areas shall be thoroughly dried or removed and replaced prior to application of sprayed polyurethane foam.
- F. Examine mounting or support members by removal, if necessary, of roof mounted mechanical equipment, such as air conditioners, evaporative coolers, fans, ducts, pipes, etc. If wood skids are utilized as support members for existing mechanical equipment, check for dry rot and replace with redwood. All such roof-mounted equipment shall be given specific consideration for proper application of sprayed polyurethane foam and elastomeric roof coating. Wood skids and support members shall not be encapsulated in the roofing system.
- G. Roof moisture/vapor vents shall be installed at the rate of one per 500-1000 square feet depending upon moisture content in the existing substrate and BUR. Cut a 3” to 4” vent hole extending through all insulation and roofing membrane to deck then attach vent to roof surface prior to application of the sprayed urethane foam: If there is a vapor barrier, leave it intact.
- H. Existing asphaltic material on top of parapet walls and around scuppers is to be removed a minimum of three inches from the perimeter.

Priming of substrate is necessary. Prime all existing asphaltic substrates with Thermo-Prime primer at the rate of one gallon per 400 sq. ft.

3.7 APPLICATION OF SPRAYED POLYURETHANE FOAM

- A. Sprayed polyurethane foam shall be metered to material supplier specifications through proportioning equipment, which provides thermostatically controlled material temperatures. Hoses between the proportioner and spray gun shall be temperature controlled. Nominal polyurethane foam thickness shall be a minimum of two inches. Foam shall be applied in no less than 1” passes. Additional foam may be required to provide positive drainage and a smooth consistent transition to the roof edge or added insulation value.
- B. Complete foam application in the same day. Foam work not completed must be protected from moisture or condensation by means of six-mil plastic or priming that day.
- C. Foam normally shall not be applied when the measured roof deck temperature is below 50°F or above 125°F (refer to foam manufacturer’s tech data on specific cold and warm weather foam requirements). Foam shall not be applied when the relative humidity is above 85%. Foam shall not be applied when wind velocities exceed 12 miles per hour, as measured by a wind velometer, unless suitable wind barriers are employed. Foam shall not be applied to any surface where visible moisture is present or, that when tested with a moisture meter, registers a reading greater than ten percent. No foam shall be applied to a roof deck if the deck temperature is within 5°F of the dew point.
Roofing contractor shall provide all equipment to check weather conditions and shall maintain a daily weather log during the project to be submitted with Warranty Request.
- D. Surface texture of the installed foam shall range from a smooth to medium coarse “orange peel” finish. Surface textures which may be defined as “popcorn” or “tree bark” are not acceptable and must be resprayed.
- E. Filleting of the foam to parapet walls, vents, skylights, roof mounted equipment, etc., shall provide a relatively smooth transition to the roof deck, shall be of uniform cross-section thickness and shall meet all other foam surface texture requirements.

- F. All areas, which fail to meet specification requirements with respect to thickness, foam quality, etc., shall be repaired and resprayed at the expense of the contractor. Application of spray foam shall not commence during inclement weather or when precipitation is imminent. Area shall be kept clear of traffic from other trades during and for twenty-four hours after completion of application.
- H. Mask off metal, brick, fascia's and other surfaces not to receive foam. Provide all procedures or means as required to prevent damage from fugitive over spray of the polyurethane foam insulation. Caution shall be taken to protect those areas not to receive spray foam, including vehicles located nearby.

3.8 APPLICATION OF SILICONE ROOF COATING:

A. Surfaces must be properly prepared, and the coating applied per guide specifications. All surfaces must be clean, dry, and frost-free before the application is started. THERMO-SIL 9600 Pro Series is applied in two coats of contrasting colors at a rate of at least 1 gallons per 100 square feet for each coat, using the material as supplied, for a minimum Dry Film Thickness (DFT) of 20 mils (min) which will allow for a 10 Year material only warranty. Apply using conventional, airless spray equipment or roller. Cure time for each coat may vary from 2 to 6 hours, depending on temperature and humidity.

For best protection of polyurethane foam, the full polyurethane foam thickness and silicone basecoat should be applied the same day. For best results, apply at temperatures above 4°C (40°F).

Note: Contact Huntsman Building Solutions Technical Service personnel for specific recommendations, pricing and availability of spray and auxiliary equipment.

- B. Mask off metal and other surfaces not to receive coating.
- C. Refer to manufacturer's application instructions and precautions in the technical datasheet for specific details on:
 1. Mixing.
 2. Recommended spray equipment.
 3. Spray techniques.
 4. Cold and hot temperature precautions during application.
- D. All foam is to be coated with the silicone elastomeric coating. Coating shall be extended up and over all foam or vent pipes and terminate a minimum of two inches above the foam creating a self-terminating flashing.
- E. Coat foam the same day of application, unless delayed by inclement climatic conditions.

- F. If foam is exposed in excess of three days and additional foam thickness is necessary, or surface oxidation has occurred apply Thermo-Prime primer and apply at a rate of 400 square feet per gallon.

3.10 CLEANING

At the end of each workday, remove rubbish, empty containers, rags, and other discarded items from the site. After completing work, clean glass and spattered surfaces. Remove spattered coatings by washing, scraping, or other methods, being careful not to scratch or damage adjacent finished surfaces.

END OF SECTION