



## **07 57 13 Sprayed Polyurethane Foam Roofing**

### **Foam-LOK™ Sprayed Polyurethane Foam with Thermo-Flex™ Acrylic 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 Lapolla Thermo-Prime™, manufactured by Lapolla Industries.
- C. SPRAYED POLYURETHANE FOAM:  
The polyurethane foam material shall be Lapolla's Foam-LOK 2.5 or 2.8 lb. density spray polyurethane, as manufactured by Lapolla Industries.
- D. COATING:  
The acrylic elastomeric roof coating shall be Thermo-Flex, 100% acrylic resin coating uniquely formulated for the protection of sprayed-in-place polyurethane foam roofing systems, as manufactured Lapolla.

##### **1.2 SUBMITTALS**

###### **ACTION SUBMITTALS / INFORMATIONAL SUBMITTALS**

- A. Submit manufacturer's product literature, warranties request information, and samples to the owner in accordance with requirements specified.
- B. Manufacturer's literature: Manufacturer's literature shall be submitted for review before work is started. Literature shall include material specifications; technical datasheets that include the estimated application rate for the required dry mil thickness, current application instructions of the





manufacturer, and a 2” x 6” sample of Thermo-Flex coating over Foam-LOK spray polyurethane foam roofing.

### 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, 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 50oF or when there is a possibility of temperatures falling below 32oF 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 50oF or above 120oF, 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 ensure good safety precautions at all times. 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 Lapolla Industries, Inc., 15402 Vantage Parkway East, Suite 322, Houston, Texas 77032. Tel: (888) 4-LAPOLLA Fax: (281) 219-4106.
- B. Provide 100% Acrylic Thermo-Flex Roof Coating by Lapolla Industries, Inc. 15402 Vantage Parkway East St. 322 Houston, TX 77032 Telephone 281.219.4100 Fax 281.219.4106
- C. Provide Thermo-Prime acrylic primer by Lapolla Industries, Inc. 15402 Vantage Parkway East St. 322 Houston, TX 77032 Telephone 281.219.4100 Fax 281.219.4106
- 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 2.5 lb. Density Roofing Foam**

Properties	Test Method/Requirements	Value
Aged “R” Value:	ASTM C-518	6.5 per inch
Compressive Strength:	ASTM D-1621 40 min.	45-55 psi
Core Density:	ASTM D-1622	2.4-2.6 lbs./ft3
Closed Cell Content:	ASTM D-2856 90 min.	>90%
Tensile Strength:	ASTM D-1623 60 min.	60-65 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	1.82 @ 1”
Dimensional Stability: 28 days at 158°F, 98%RH	ASTM D-2126	1.54

**Credentials/Certifications**

- Underwriters Laboratories Inc. File R14353
- ASTM E-84 Flame Spread Index ≤15; Smoke Development ≤550
- FM Global 4880/4470
- Florida Building Code Approval #11066





- Dade County Approval
- NOA#08-0402.05 Concrete
- NOA#08-0909.05 Recover
- NOA#08-0402.07 Steel
- NOA#08-0402.06 Wood
- California State Fire Marshall
- California Bureau Of Home Furnishings and Thermal Insulation Reg. NO. CA-T444 (TX)

**Foam-LOK 2.8 lb. Density Roofing Foam**

Properties	Test Method/Requirements	Value
Aged “R” Value:	ASTM C-518	6.5 per inch
Compressive Strength:	ASTM D-1621 40 min.	55-65 psi
Core Density:	ASTM D-1622	2.7-2.9 lbs./ft3
Closed Cell Content:	ASTM D-2856 90 min.	>90%
Tensile Strength:	ASTM D-1623 60 min.	55-65 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	1.82 @ 1”
Dimensional Stability: 28 days at 158°F, 98%RH	ASTM D-2126	1.54

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**2.4 ELASTOMERIC COATING:**

A. Thermo-Flex 1000 is a technologically advanced, high solids, fire retardant, thixotropic, acrylic elastomeric coating uniquely formulated for the protection of polyurethane foam insulation. Thermo-Flex is designed to withstand the damp heat and ultra-violet rays of humid environments. Acrylic elastomeric coatings shall conform to the following minimum physical properties:

**Thermo-Flex 1000 Acrylic Elastomeric Coating**

Properties	Test Method/Requirements	Value
Standard Colors:	<b>TF 1001-White is Cool Roof Rating Council Rated: Reflectivity: .86 Emmissivity: .90</b>	STANDARD COLORS: TF 1001 – WHITE TF 1002 – GRAY TF 1003 – TAN
Tensile Strength:	ASTM D2370	300psi (±25)
Elongation:	ASTM D2370	260% (±25)
Adhesion:	ASTM C794-D 903	7.0 plf PUF(dry) 3.6 plf PUF(wet) 1.4 plf Galv. Steel (dry) 3.0 plf Galv. Steel (wet)
Hardness (Shore A):	ASTM D2240	62 (±2)
Permeability:	ASTM D1653A	11 U.S. Perms @ 20mils





Tear Resistance:	ASTM D624	85 lbs/in. (±2)
Solids by Weight:	ASTM D1644	67% (±3)
Solids by Volume:	ASTM D 2697	55% (±3)
Weight per Gallon:	ASTM D1475	11.95 (± .2)
Theoretical Coverage:	13-14 dry mills	1.5 gallons
Viscosity (cps):	ASTM D 562	110 K.U. (±8)
Reflectivity:	TF 1002/03	NEW: 85% AGED: 78%
Emmissivity	TF 1002/03	.89
Dry to Touch:		4 hours
Tack Free:		12 hours
Recoat Window:		12 hours
Shelf Life:	When properly stored	1 Year

## 2.5 SUBSTITUTIONS

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





## **PART 3 - EXECUTION**

### **3.1 INSTALLERS**

- A. 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 is necessary.

### **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.
- E. 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 necessary. Prime all metal substrates with Thermo-Prime at the rate of one gallon per 400 sq. ft.
- 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.



3. If gypsum board is used, one gallon per 200 square feet of Thermo-Flex Prime SG should be applied as moisture protection and primer.

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

### **3.5 SURFACE PREPARATION - WOOD SURFACES**

- A. Plywood joints in excess of 1/4" shall be taped or filled prior to application of sprayed urethane foam.
- B. T & G materials must be overlaid with a minimum of 1/4" thick plywood sheathing or other acceptable flat sheet material.
- C. The deck shall be dry and free of loose dirt, grease, oil and other contaminants.
- D. Loose dirt can be removed by use of air jet, vacuum, hand, or power broom. No washing permitted.
- E. Grease, oil or other contaminants must be removed by use of proper chemical solvents.
- F. Priming of substrate is necessary. All surfaces to receive foam must be primed with Thermo-Prime at the rate of one gallon per 400 square feet.

### **3.6 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.
- I. 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 1/2" 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.
- G. 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, fascias 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 ACRYLIC ELASTOMERIC ROOF COATING:

- A. Apply in a minimum of 2 coats with each coat at a maximum rate of 1.5 gallons per 100 square feet, for a total minimum coating rate of 3 gallons per 100 square feet. Additional coats of 1.5 gallons maximum per 100 square feet may be applied to obtain the desired final thickness of coating. The minimum allowable dry mill thickness shall be 24 mils.
- B. Each coat shall be allowed to cure a minimum of 12 hours (depending upon drying conditions) before proceeding with successive coats. Second and successive coats must be applied within 48 hours to ensure good adhesion.
- C. The new nominal thickness of the final dry film protective elastomeric acrylic coating system, in order to obtain a Lapolla roof warranty, shall be an average 30 mils with a minimum of 25 mils for the five year warranty. Requirements for a 10-year warranty shall be an average 40 mils with a minimum of 35 mils.
- D. Mask off metal and other surfaces not to receive coating.
- E. 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.
- F. All foam is to be coated with the acrylic 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.
- H. Coat foam the same day of application, unless delayed by inclement climatic conditions.
- I. 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.

### 3.9 ROOFING GRANULES





- A. Roofing granules or a reinforced polyester mesh shall be installed around all mechanical equipment at least six feet out as follows:
1. Apply an additional coat of acrylic coating at the rate of 1-1/2 gallons per 100 square feet.
  2. Broadcast grade 11 roofing granules at a rate of 30-40 pounds per 100 square feet or lay down the reinforced polyester mesh while the coating is in a fluid condition.
  3. Seal granules or polyester mesh in by applying additional coating at the rate of 3/4 gallon per 100 square feet. No foot traffic shall be permitted on the finished coated surface for 72 hours after application.

### 3.10 CLEANING

- A. At the end of each work day, 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**