

ALPHA 15-Year Permthane II FR w/Granules

Section 07 57 13

Sprayed Polyurethane Foam Roofing

Guide Specification

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Furnish all labor, materials, tools and equipment necessary for the application of sprayed polyurethane foam roofing (Alpha 15-Year Permthane II FR w/Granules), including accessory items, subject to the general provisions of the contract.
 2. The manufacturer's application instructions for each product used are considered part of this specification and should be followed at all times.
- B. All existing HVAC and other equipment shall be protected from any damage that could be caused by roofing demolition, foam over spray, coating, and mishandling.
- C. Raising, re-setting, and protection of air conditioning equipment, ventilators, and exhaust fans may be required.
- B. Related Sections:
1. Section 03 03 00 - Cast-in-Place Concrete
 2. Section 05 30 00 - Metal Decking
 3. Section 06 10 00 - Rough Carpentry
 4. Section 07 20 00 - Thermal Protection
 5. Section 07 50 00 - Membrane Roofing
 6. Section 07 60 00 - Flashing and Sheet Metal
 7. Section 07 70 00 - Roof and Wall Specialties and Accessories
 8. Section 07 80 00 - Roof Windows and Skylights

1.2 SUBMITTALS

- A. Submit reference list of 50 similar projects independently verified by and approved third party. Include project name, location, scope and current contact information. A minimum of 5 of these projects must include the application of Coating Manufacturers polyurethane products and a minimum of 5 of these projects must include the application of the SPF Manufacturers spray polyurethane foam products approved for use on this project.
- B. Submit product data sheets for primers, polyurethane foam, elastomeric polyurethane coating, and MSDS for all products, other safety and handling instructions and installation instructions.
- C. Submit 3" x 4" sample of specified sprayed polyurethane foam roofing (ALPHA 15-Year Permthane II FR w/Granules on Sprayed Polyurethane Foam). Samples shall be construed as examples of finished color and texture of the system only.
- D. Submit a letter issued by Coating Manufacturer stating approved licensed applicator status and approval to issue ALPHA warranty for specified system on this project.
- E. Submit a copy of the current ALPHA warranty for the sprayed polyurethane foam roofing.

1.3 QUALITY ASSURANCE

- A. Manufacturer(s) shall be a current participant of the NEOGARD ALPHA program as administered by PBSRG.
- B. Applicators shall be current approved applicators as identified by the NEOGARD ALPHA program.
- C. Requirements of Regulatory Agencies:
1. Materials used in the ALPHA 15-Year Permthane II FR w/Granules coated foam roof shall meet Federal, State and local VOC regulations.
 2. The ALPHA system shall be approved for use on this project and rated E108 or "Class A" by Underwriters Laboratories. (ASTM E-108/UL 790).
- D. Field Quality Control: Upon completion of the ALPHA roofing system installation, an inspection by a NEOGARD approved, pre-qualified third party inspection company is required. Cost of the inspection shall be borne by the installing contractor. The inspection will confirm that the installation meets or exceeds minimum requirements as detailed within this specification.
- E. Post Hail Testing: After third party confirmation that the specification requirements have been met, the Factory Mutual severe hail test may be performed on the finished roof installation at the written request of and cost to the building owner. The test will be

performed at a location mutually agreed upon by the owner and applicator. This test can be conducted at any time within the first three years of the warranty period and if failure occurs, the affected roof area shall be inspected as to the cause of the failure, and repaired in accordance with the ALPHA manufacturers' and applicators' license agreements. Upon completion of the required repairs, the Factory Mutual severe hail test will be repeated in the same location as before. The building owner will not be responsible for any costs associated with repairs and retesting.

1.4 DELIVERY, STORAGE & HANDLING

- A. Materials shall be delivered in original sealed containers, clearly marked with supplier's name, product identification, safety information and batch or lot number.
- B. Recommended material storage temperature is 75°F (24°C). Handle products to avoid damage to the container. Do not store in direct sunlight. The ALPHA Roofing system should be installed within three months of manufacture date of any materials under this specification. All materials shall be stored in compliance with local fire and safety requirements. All materials shall be handled in accordance with the Manufacturers guidelines.

1.5 PROJECT CONDITIONS

- A. Environmental Conditions:
 - 1. Do not proceed with application of sprayed polyurethane foam materials or elastomeric polyurethane coating materials when substrate temperature and/or ambient conditions are less than 40°F (4.4°C).
 - 2. Do not proceed with application of sprayed polyurethane foam or elastomeric polyurethane coating materials when inclement weather is imminent or when temperature and /or humidity are outside the limits set by the manufacturer.
 - 3. Do not apply material unless surface to receive sprayed polyurethane foam and/or elastomeric polyurethane coating is clean, dry and free of all contaminants.
 - 4. Wind barriers shall be used if wind conditions could affect the quality of the spray polyurethane foam or elastomeric polyurethane coating installation during spraying. The elastomeric polyurethane coating can be either spray or roller applied.

1.6 SEQUENCING AND SCHEDULING

- A. In new construction projects or projects where other trades are also at work, the sprayed polyurethane foam is installed when the deck, parapet walls, rough openings, and curbs are completed. The type of skylight used will determine when the skylights should be installed. Plumbing vents, drains, and electrical penetrations should be in place. No other trades are permitted on the roof while the sprayed polyurethane foam and elastomeric polyurethane coating are being installed.

1.7 WARRANTY

- A. The materials (sprayed polyurethane foam and elastomeric polyurethane roof coating) and workmanship included in this specification shall be jointly and severally guaranteed by NEOGARD and the licensed applicator for 15 years.
- B. Guarantee against leaks, sprayed polyurethane foam or elastomeric polyurethane coating membrane failures caused by faulty material or workmanship or by ordinary weathering, bird peck damage, wind forces up to 90 mph, and severe hail (SH) damage as defined by Factory Mutual Research Corporation (FMRC) simulated hail damage tests.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. NEOGARD Division of Jones-Blair Company, 2728 Empire Central, Dallas, TX 75235, (800) 321-6588, www.NEOGARD.com for the elastomeric polyurethane coating.
- B. BASF Corporation, 1609 Biddle Avenue, Wyandotte, MI 48192, (800) 547-4004, www.basf.com/spray for the spray polyurethane foam (SPF).

2.2 MATERIALS

- A. Sprayed Polyurethane Foam
 - 1. The sprayed polyurethane foam insulation shall be a two-component system made by combining an isocyanate (A) component with a polyol (B) component. The sprayed polyurethane foam system shall be BASF Elastospray ALPHA (B) component and Elastospray (A) component as made by BASF Corporation or ALPHA program approved equal.
 - 2. The cured sprayed in place polyurethane foam shall have the following minimum characteristics:

PERFORMANCE REQUIREMENTS FOR CURED FOAM		
PHYSICAL PROPERTIES	TEST METHOD	RESULTS
Tensile Strength	ASTM D1623	60-80 psi
Density	ASTM D 1622	2.9-3.2 pcf
Compressive Strength (parallel to rise)	ASTM D1621	55 +/- 5% psi @ yield
Closed Cell Content	ASTM D1940	>90% min.
Humid Aging (& % linear change) 158°F, 97% RH, 28 Day	ASTM D2126	-0.26%
K Factor (aged)	ASTM C518	0.158 BTU/hr ft ² °F/in.
Flame Spread (nominal 2" thickness)	ASTM E84	55 max.

B. Elastomeric Coating System

1. The elastomeric polyurethane coating shall be the Permthane II FR system as manufactured by NEOGARD®, Dallas, TX and consist of 70620 base coat and 70611 series top coat.
2. Performance requirements for cured elastomeric coating system used on this project are:

PERFORMANCE REQUIREMENTS FOR CURED FILM			
PHYSICAL PROPERTIES	TEST METHOD	BASE COAT	TOPCOAT
Tensile Strength	ASTM D412	1,000 psi	1,500 psi
Elongation	ASTM D412	375%	360%
Permanent Set	ASTM D412	<10%	<10%
Tear Resistance	ASTM D1004	100 lb/in	140 lb/in
Water Resistance	ASTM D471	<3 @ 7 days	<3 @ 7 days
MVT @ 30 mils	ASTM E96	1.6 Perms	2.2 Perms
Shore A	ASTM D2240	50 - 55	70 - 75
Adhesion	ASTM D903	20 lb/in	15 lb/in
Weathering Resistance	ASTM D822	N/A	Slight Chalk
Thermal Shock	Alternate Heat/Cold	No Loss of Adhesion	No Loss of Adhesion
Fire Resistance	ASTM E108, UL 790	System Rated Class "A"	

C. ACCESSORIES

1. Miscellaneous materials such as primers, elastomeric sealants, metal, vents, and drains shall be a composite part of the roof system and shall be compatible with the ALPHA roofing system.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

- A. Existing substrates must be clean, dry and free of all loose dirt, dust and debris. Oil, grease, release agents or other contaminants shall be removed with proper cleaning solutions. When installing sprayed polyurethane foam over existing built up, modified bitumen, single ply, metal or other existing roof assemblies, a nondestructive evaluation using infrared, technology shall be required. In lieu of a nondestructive evaluation, core cuts may be taken a minimum of 1 every 10 squares in the existing roof assembly down to the structural deck to confirm the existing assembly is free of trapped moisture. Licensed applicator must provide written verification of the test method used for determining the condition of the existing roofing system. Written verification

must include a roof diagram indicating where core cuts were taken, or a copy of the nondestructive roof scan. Licensed applicator must also confirm that all wet roofing materials have been removed and replaced with like and kind materials prior to installation of sprayed polyurethane foam.

- B. Concrete: Verify that the work done under other sections meets the following requirements:
1. Remove loose dirt, dust and debris by using compressed air, vacuum equipment or wet-vac. Oil, grease, release agents or other contaminants shall be removed with proper cleaning solutions.
 2. That the concrete was cured for a minimum of 28 days. Water-cured treatment of concrete is preferred. The use of concrete curing agents, if any, shall be of the sodium silicate base only; others require written approval by the sprayed polyurethane foam Manufacturer.
 3. All joint openings in concrete decks that exceed ¼ inch shall be grouted or caulked prior to application of the polyurethane foam.
 4. Lightweight or insulating concrete are not recommended for direct ALPHA sprayed polyurethane foam application.
 5. Concrete surfaces shall be primed with NEOGARD's 7760/7761 primer or other primer recommended by the sprayed polyurethane foam Manufacturer.
- C. Wood: Verify that the plywood deck work done under other sections meets the following requirements:
1. Plywood shall be exterior grade quality and minimum B-C grade. Plywood shall be at least 5/8" thick. Tongue and groove plywood is preferred. Attachments must meet building code requirements for resistance to wind uplift.
 2. Joist spacing beneath plywood deck has a maximum spacing of 16" on center. Plywood shall not have a deflection of greater than 1/240 or the span when subjected to maximum design load.
 3. Plywood imperfections are filled with a one-part moisture cured polyurethane sealant as recommended by the sprayed polyurethane foam Manufacturer.
 4. Any wet, bowed, delaminated or otherwise damaged decking shall be removed and replaced with new material.
 5. A maximum of 1/16" space between sheets of plywood is maintained while deck is being placed.
 6. Deck shall be free of loose dirt, grease, oil or other contaminants prior to priming. No washing is permitted.
 7. Priming of wood deck with NEOGARD's 7760/7761 primer or other primer as recommended by the sprayed polyurethane foam Manufacturer shall be required.
 8. Plywood decking is to be covered as soon as possible after installation.
- D. Metal Roof Panels: Verify that the work done under other sections meets the following requirements:
1. Metal surfaces to be foamed shall be free of rust, loose scale, dust, dirt, grease, oil, chalking paint or other contaminants.
 2. Grease, oil, chalking paint or other obvious contaminants must be removed with NEOGARD's 8500 Cleaner and water or other approved solutions as required by job conditions. Remove all cleaning solutions with plenty of fresh water.
 3. Metal surfaces having loose scale or rust must be cleaned and primed prior to sprayed polyurethane foam application as job conditions dictate.
 4. Clean and prime all non-ferrous metal surfaces such as galvanized metal, aluminum, and stainless steel with a primer and procedures recommended by the sprayed polyurethane foam Manufacturer.
 5. Fluted metal decks require a suitable method of covering the flutes prior to the application of the sprayed polyurethane foam. Flutes may be covered with fastened or adhered insulation board, Dens-deck, gypsum board, special polyester tapes, or sprayed polyurethane foam.
- E. Existing Built-Up/Aggregate Roofs:
1. All loose gravel or other aggregate, dust, and debris shall be removed using power vacuum equipment, hydro-vac, power sweeper, or other suitable means.
 2. Examine roof for areas where cold application asphaltic materials may have been applied. Remove all cutback asphalts and plastic cements down to the existing felts.
 3. Remove and replace all blisters and delaminating materials and replace to grade.
 4. Inspect and test the existing roof assembly for the presence of moisture. Wet (areas with greater than 15% moisture content) areas and areas of saturation must be removed and replaced with compatible materials.
 5. Remove or refasten all loose base flashing, counter flashing, and gravel stops as required.
- F. Aged Polyurethane foam roof systems:
1. Remove the top ½" of the existing surface of the sprayed polyurethane foam/coating system by means of a mechanical scarifier to a level surface. Any wet or loose areas shall be completely removed and replaced to grade.
 2. Vacuum or blow the resulting polyurethane foam surface free of all dust and debris.
 3. Prime surface of the polyurethane foam with a dark primer as recommended by the sprayed polyurethane foam Manufacturer. Apply a minimum of 1" sprayed polyurethane foam to the resulting primed sprayed polyurethane foam surface with the first pass of foam being ½" thick.
- G. Other Considerations: Lightning rods, security devices, electrical conduits and other ancillary rooftop projections and/or equipment shall be masked prior to the application of the polyurethane foam. Lightning rod cables shall not be embedded in the SPF and should be removed prior to the SPF application. Electrical and mechanical conduits should be relocated or raised above the roof surface.

3.2 SPRAYED POLYURETHANE FOAM APPLICATION

A. APPLICATION

1. The sprayed polyurethane foam application shall not proceed during a periods of inclement weather, nor should any SPF be applied until exterior surfaces are thoroughly dry. The SPF shall not be applied below an ambient air or substrate temperature of 40°F (4.4°C) and /or above 85% relative humidity.
2. The application of the polyurethane foam shall be in accordance with sprayed polyurethane foam Manufacturer's instructions
3. The sprayed polyurethane foam shall be applied in a minimal pass thickness of ½ inch.
4. The spray equipment used shall be that recommended by the sprayed polyurethane foam Manufacturer.
5. The sprayed polyurethane foam thickness shall be a minimum of 1.5 inches after cured. The polyurethane foam shall be applied uniformly over the entire surface with a tolerance of plus ¼ inch of thickness minus 0, except where variations are required to insure proper drainage or to complete a feathered edge. The sprayed polyurethane foam shall not be applied in thickness greater than 2 inches in one pass.
6. The final sprayed polyurethane foam surface texture shall be "smooth, orange peel, course orange peel, or verge of popcorn". SPF surfaces termed "popcorn" or "treebark" surfaces are unacceptable. These areas shall be removed and re-sprayed to an acceptable surface. (See Addendum A)
7. The SPF shall be uniformly terminated a minimum of four (4) inches above the roofline at all penetrations (except drains, parapet walls, or building junctions). Sprayed in place cants shall be smooth and uniform to allow positive drainage. (See Addendum B – Detail Drawings) Snowmen, term used to describe the finish of sprayed polyurethane foam, is not acceptable.
8. If polyurethane foam is not coated within 24 hours, surface shall be examined for surface oxidation and moisture contamination. If oxidation or contamination exists, contact the ALPHA sprayed polyurethane foam Manufacturer for recommendations.
9. Any damage or defects to the polyurethane foam surface shall be repaired prior to the elastomeric polyurethane coating application.

- B. Flashings and Coverings: Flashings and waterproof coverings for expansion joints shall be uncured, non-staining, 60 mil (0.060") Neoprene elastomeric sheet material.

3.3 ELASTOMERIC POLYURETHANE COATING APPLICATION

- A. ALPHA System: The fluid-applied elastomeric protective coating system, herein specified, shall be applied in accordance to the procedures outlined below. The composite protective coating system includes the following:

1. Base Coat:
 - a. The initial base coat shall be applied the same day as the sprayed polyurethane foam. If due to weather conditions, more than 24 hours elapse between sprayed polyurethane foam and the base coat application, the sprayed polyurethane foam shall be inspected for UV degradation by an approved third party inspector. If such degradation is present contact the sprayed polyurethane foam Manufacturer for recommended procedures.
 - b. The sprayed polyurethane foam shall be free of dust, dirt, contaminants and moisture prior to the application of the base coat.
 - c. Apply the elastomeric polyurethane 70620 Series base coat membrane at a minimum rate of 3 gallons per 100 sq.ft. in a minimum of 2 coats to yield an average thickness of 37 dry mils in strict accordance with procedures outlined by NEOGARD.
2. Topcoat:
 - a. Subsequent coating shall be applied in a timely manner to insure proper adhesion between coats.
 - b. The previous base coat shall be allowed to cure and be inspected for pinholes, thinly coated areas, uncured areas or other defects. Any defects shall be repaired prior to the topcoat application. The base coat shall be free of dirt, dust, moisture, or other contaminants prior to the application of the topcoat.
 - c. Apply the elastomeric polyurethane 70611 Series topcoat membrane at a minimum rate of 3/4 gallon per 100 sq.ft. in 1 coat to yield an average thickness of 9 dry mils in strict accordance with application procedures outlined by NEOGARD.
 - d. The cured dry film thickness of the finished multiple coat application shall be checked according to NEOGARD's specifications. Areas that are found to have less than the thickness specified shall require additional coating.
3. Aggregate Finish:
 - a. Apply the elastomeric polyurethane 70611 Series topcoat membrane at a minimum rate of 3/4 gallon per 100 sq.ft. in 1 coat to yield an average thickness of 9 dry mils in strict accordance with application procedures outlined by NEOGARD. Immediately broadcast a Neogard approved #11 roof granules into wet coating at the rate of 30 lbs. per 100 square feet. When dry, remove excess loose granules. Minimum coating thickness of the system at any point on the roof to be 20 dry mils beneath the aggregate. The above application rates are theoretical, calculated for glass-smooth surfaces with no allowances made for loss, job or surface conditions. The applicator is to compensate for these conditions and provide the specified dry mils coverage rather than apply the coatings at only the theoretical coverage rate.

3.4 FIELD QUALITY CONTROL

- A. Prior to beginning any work, a representative from Neogard, Applicator and Owner shall meet at the project site in a pre-construction meeting to identify any risks and assist the Alpha Approved Applicator in developing a Risk Management Plan (RMP).
- B. From preconstruction through project completion the applicator is to provide the ALPHA Manufacturers, PBSRG, and the Owner with Weekly Risk Reports. (See Addendum C)

C. Following project completion, a detailed inspection shall be conducted by an approved third party inspector.

3.6 CLEANING

A. Remove debris, resulting from completion of coating operation, from the project site.

END OF SECTION