SECTION 07 57 00

COATED FOAMED ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Foamed-in-place insulation.

B. Protective overcoat.

1.02 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness.

C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension.

D. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

E. ASTM D1622/D1622M - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

F. ASTM D1623 - Standard Test Method for Tensile And Tensile Adhesion Properties of Rigid Cellular Plastics.

G. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

H. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.

I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

J. UL 790- Standard for Standard Test Methods for Fire Tests of Roof Coverings.

K. UL (DIR)- TGIK.R9303-Roofing Systems, Uplift Resistance.

L. ICC ESR-2532 Evaluation Report.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate installation of control and expansion joints.
2. Coordinate installation of roof drains and sumps and related flashings.

B. Preinstallation Meeting: Convene one week before starting work of this Section.
1. Convene a pre-installation meeting under general provisions of Section 01 70 00.
2. Require attendance of parties directly concerned with the work of this Section, including those who are required to coordinate with the work, and those who are required to protect the work upon completion. Include the manufacturer's technical representative.
3. Review installation procedures and coordination required with related work.

C. Sequencing: Schedule work after all penetrations through roof are complete and perimeter conditions are ready to receive roof system.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on foam insulation and overcoat, physical and chemical properties, preparation of substrate required, product limitations, and cautionary requirements.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Test Reports: Provide test reports indicating that specified requirements are achieved by the products being supplied.

E. Manufacturer's Instructions: Indicate installation requirements and procedures.

F. Manufacturer's Reports: Indicate procedures followed, ambient temperatures and wind velocity during application.

G. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing both products specified in this section, with not less than twenty years of documented experience. Manufacturer must manufacture both foam and coatings.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 10 years documented experience, and approved by manufacturer.

C. Work of this Section to comply with manufacturer's instructions.

D. Basis of Design: Specifications and Drawing details are based on coated foamed roofing system by the specified basis of design manufacturer. Coated foamed roofing systems manufactured by other acceptable manufacturers are permitted, subject to compliance with performance requirements; and provided that deviations in materials and applications are minor, and do not detract substantially from the indicated design intent.
1. Comply with requirements specified in Section 01 40 00 and Section 01 60 00.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store foamed roofing products in ambient temperatures between 50 degrees F and 100 degrees F.

C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

1.07 FIELD CONDITIONS

A. Do not install foam insulation during the following conditions:
1. When ambient temperature is below 50 degrees F or above 110 degrees F.
2. When wind velocity is above 15 mph, provide windscreens; when wind speed is above 25 mph, installation is prohibited.
3. When substrate temperature is greater than 180 degrees F or below 40 degrees F, or when dew point is less than 5 degrees F above ambient temperature.
4. When substrate moisture is present, during rain, snow, fog, or mist.
5. When there is a forecasted possibility of ambient temperature falling below freezing with 24 hours of commencement of installation or precipitation is expected within 24 hours.

B. Do not install overcoat during the following conditions:
1. When ambient temperature is below 50 degrees F.
2. When wind velocity is above 25 mph.
3. During periods of precipitation.
4. When there is a forecasted possibility of ambient temperature falling below freezing with 24 hours of commencement of installation or precipitation is expected within 24 hrs.

C. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.08 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 10 *(15/20)* year period after Date of Substantial Completion.

C. Provide 5,10 *(15/20)* year manufacturer warranty for complete roofing system; manufacturer's standard limited material warranty, and "No Dollar Limit" (NDL) system warranty.
   1. Provide coverage of roofing system for delamination of bond, discoloration or fading, and water tightness.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design Manufacturer:
   1. SWD Urethane; Quik-Shield™ / 155-2.5 Coated Foamed Roofing System: www.swdurethane.com.
   2. Substitutions: See Section 01 60 01 - Product Requirements.

B. Other Acceptable Manufacturers:
   1. Accella Polyurethane Systems: www.accellapolyurethane.com/#sle.
   2. BASF Corporation: www.spf.basf.com/#sle.
   3. Icynene-Lapolla: www.lapolla.com/#sle.
   4. Neogard Division of Jones-Blair Company: www.neogard.com/#sle.
   5. Substitutions: See Section 01 60 01 - Product Requirements.

2.02 REGULATORY REQUIREMENTS

A. Comply with applicable building codes for fire resistance rating of roofing system.

2.03 FOAM INSULATION MATERIALS

A. Foam Insulation: Sprayed polyurethane foam (SPF) type, closed cell; foamed on-site, using blowing agent of water or non-ozone-depleting gas. (2.5 physical properties listed)
   1. Density: 2.5/2.8/3.0 lbs/cu ft, nominal, in accordance with ASTM D1622/D1622M.
   2. Tensile Strength: 41 psi, minimum, in accordance with ASTM D1623.
   3. Compressive Strength: 45 psi, minimum, in accordance with ASTM D1621.
   4. Thermal Resistance: R-value of 5.7, minimum, per 1 inch thickness at 77 degrees F mean temperature when tested in accordance with ASTM C518.
   5. Water Vapor Permeance: Vapor retarder; 1.5 perms, maximum, when tested at 1 inch thickness in accordance with ASTM E96/E96M, desiccant method.
   6. Closed Cell Content: At least 92 percent.

B. Substrate Primer: As required by insulation manufacturer for indicated application conditions.

2.04 OVERCOAT MATERIALS

Spec Note

(Remove from final Draft): Choose coating appropriate to project and climate. Contact Ron Stas at SWD Urethane (toll free) 1-800-828-1394 for assistance

A. Overcoat: Acrylic base and cover coats, _____ color.
   1. Tensile Strength (ASTM D412): 280 psi.
   2. Foam Adhesion Failure dry (peak) D-423 6.1
   3. Elongation (ASTM D412): 355 percent.
   4. Water Vapor Permeance: 3.5 perms @ 20mils, maximum, when tested in accordance with ASTM E96/E96M.
   5. Solar Reflectance Index (SRI): 103 percent, when measured in accordance with ASTM E1980.
   6. Solar Reflectance: 82 percent, when measured in accordance with ASTM E903.
   7. Hardness (Shore A): 60, when tested in accordance with ASTM D2240.
   8. Basis of Design: Specified manufacturer's Quik-Shield 1929.

B. Overcoat: Silicone base and cover coats, _____ color.
   1. Tensile Strength (ASTM D412): 245 psi.
   2. Elongation (ASTM D412): 235 percent.
   3. Water Vapor Permeance: 10.7 perms, maximum, when tested in accordance with ASTM E96/E96M.
   4. Solar Reflectance Index (SRI): 105/110 percent, when measured in accordance with ASTM E1980.

5. Solar Reflectance: 87 percent, when measured in accordance with ASTM E1549.
6. Hardness (Shore A): 37, when tested in accordance with ASTM D2240.
7. Basis of Design: Specified manufacturer's Quik-Shield 2120.

C. Overcoat: Cementitious cover coats over acrylic base coats, _____ color.
1. Solar Reflectance Index (SRI): 101 percent, when measured in accordance with ASTM E1980.
2. Solar Reflectance: 81 percent, when measured in accordance with ASTM E903.
3. Basis of Design: Specified manufacturer's Quik-Shield 2020.

D. Granule Cover: Ceramic coated roofing granules, No. 6, 9, or 11 screen size, color as selected.

2.05 ACCESSORIES

A. Spray Foam Cant Strip: Spray polyurethane foam (SPF) insulation, applied at interruptions and penetrations through roof surface and providing 45 degree slope transition to roof surface.

B. Sealant: Type required or recommended by roofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that deck surface is smooth and dry and deck joints do not exceed 1/16 inch.

B. Verify that concrete substrate is cured with moisture content not exceeding 12 percent.

C. Verify that wood substrate moisture content does not exceed 12 percent; no depressions or splinters exist.

D. Verify flatness and tight joints of wood decking.

E. Verify that metal deck has no gaps and laps are closed.

3.02 PREPARATION - WOOD DECK

A. Seal joints of plywood with tape.

B. Tape over knot holes.

C. Remove materials or substances that will interfere with total adhesion of foam insulation to substrate.

D. Mask off adjacent surfaces that are not scheduled to receive foam.

3.03 PREPARATION - CONCRETE DECK

A. Fill surface honeycomb and variations with latex filler.

B. Remove materials or substances that will interfere with total adhesion of foam insulation to substrate.

C. Mask off adjacent surfaces that are not scheduled to receive foam.

D. Prime per manufacturer’s recommendation.

3.04 PREPARATION - METAL DECK

A. Install preformed sound absorbing glass fiber insulation strips supplied under Section 05 31 00, in acoustic deck flutes; in accordance with manufacturer's instructions.

B. Remove materials or substances that will interfere with total adhesion of foam insulation to substrate.

C. Mask off adjacent surfaces that are not scheduled to receive foam.

D. Prime per manufacturers recommendation.

3.05 PREPARATION - TO EXISTING ROOF SYSTEM

A. Prepare existing roofing surface in accordance with Section 07 01 50.19.

B. Use materials or substances that will not interfere with total adhesion of foam insulation.

C. Mask off adjacent surfaces that are not scheduled to receive foam.

D. Prime per manufacturer’s recommendation.

3.06 INSULATION INSTALLATION

A. Apply primer and foam insulation in accordance with manufacturer's instructions.

B. Place insulation to a thickness to achieve an average thermal resistance R-value of ____.

C. Extend foam 8 inches above roof surface vertical intersections, fillet insulation and feather out. Form a cant of foam at perpendicular interruptions.

D. Apply foam to slope to drains minimum 1/8 inch per foot.

E. Surface Flatness: 1/4 inch per foot measured with a straight edge.

F. Apply foam to permit first coat of overcoat application on same day. If this time limit is exceeded, prepare foam skin surface in accordance with manufacturer's instructions.

G. Develop finish skin surface to smooth and unbroken "orange peel" texture. Uneven surfaces are not acceptable.

H. As the work of this Section proceeds, coordinate the work with installing associated metal flashings specified in Section 07 62 00.

3.07 FLASHINGS AND ACCESSORIES

A. Seal flashings and flanges of items penetrating membrane.

3.08 OVERCOAT INSTALLATION

A. Install overcoat in accordance with manufacturer's instructions.

B. Prepare and seal penetrations through roof with sealant.

C. Apply overcoat in two coats (or more) with dissimilar colors for each coat to a total dry film thickness required to meet specified warranty.

D. Extend overcoat to cover foam insulation and extend 2 inches above foam termination on protrusions to a self-terminating, water tight seal.

E. Walkway reinforcement. Apply granules or cement as an additional overcoat to achieve complete cover.

F. Apply roof surface granules in accordance with manufacturer's instructions.

3.09 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Testing will include verification of insulation properties, thickness, coverage of overcoat, number of coats, and color.

3.10 CLEANING

A. Remove excess insulation or overcoat from finished surfaces.

B. In areas where finished surfaces are soiled by work of this Section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.11 PROTECTION

A. Ensure roof surface is free of traffic for minimum three days after overcoat application.

END OF SECTION