SECTION 07570
SWD Urethane Company
COATED FOAM ROOF SYSTEM

Part 1 GENERALSUMMARY

Section Includes: Coated foam roofing, as shown on drawings and specified herein.

1.01 SYSTEM DESCRIPTION:

A. Roof System shall be UL-790 (ASTM E-108) Class A or Class B roof system and conform to UBC Sections 1501-1510 and UBC Code Standard 15-2. System shall meet UL-1256 Construction Methods #136, #I81 and #206. Roof System shall meet UL-1897 Standard for Wind Uplift and UL-2218 Standard for Impact Resistance. Roof System shall meet required ICC Revised AC-12/ASTM C-1029 and ASTM D-6083 acrylic coating criteria, and "Energy Star" Guidelines and CRRC requirements.
B. Roof System shall be Class A Roof System on non-combustible deck with Class B rating over Combustible Deck that conforms to ASTM Test Standards, ICC, UBC, CRRC AND California Title 24, Energy Code requirements; and may provide LEED credits depending upon use.
C. 1. 10 Year Warranty System
    a. One inch (minimum) of sprayed polyurethane foam (additional inches may be added and /or sloped depending upon desired insulation value) on the deck surface with (25) mil thickness of white, reflective 100% acrylic roof coating with #9 white limestone granules or #11 ceramic granules imbedded into or on top of the wet coating at (30) pounds per 100 square feet. The roof system will provide a 10-year, no-leak warranty.
    b. Low cost sustainable foam roof system is easily maintained, repaired and upon inspection, may be re-coated with elastomeric protective coating after ten (10) years.

1.02 SUBMTTTALS

A. Product Data: Submit manufacturer's material specifications, installation instructions and evidence of UL, ICC, CRRC, “Energy Star,” CRRC, California Title 24, and Bureau of Home Furnishings and Thermal Insulation in California.
B. Provide specimen copy of the applicable warranty for this project, as specified herein.
C. Submit evidence that Coated Foam Insulated Roof System is approved in accordance with UL-1256 Class A Testing.
D. Submit evidence that Coated Foam Insulated Roof System is approved in accordance with UL-2218 Impact Resistance Testing.
E. Submit evidence that Coated Foam Insulated Roof System is approved in accordance with UL Reports P-733, P-826 or P-904 for Hourly Fire Resistance Design Ratings on specific decks where applicable.
F. Submit evidence that polyurethane foam with HFC 245fa blowing agent in Coated Foam Roof System is approved in accordance with Montreal Protocol and U.S. EPA non-depleting ozone requirement.

G. Submit evidence that top coatings on Coated Foam Insulated Roof Systems are approved in accordance with "Energy Star" and CRRC Solar Reflectance and Thermal Emittance Testing.
H. Submit evidence of Applicator's IPP (Injury and Illness Protection Plan) and Site Specific Fall Protection Plan.

1.03 QUALITY ASSURANCE

A. Qualifications:
    1. Manufacturer: Company specializing in manufacturing products, specified with minimum (5) years documented experience.
    2. Applicator: Roofing applicator with 5 years experience in work of similar scope and nature to that specified and approved by manufacturer of roofing material and certified or licensed by the manufacturer.
    3. Applicator: Must have documented Injury & Illness prevention program (IPP) as part of submittals, prior to awarding contract and invitation to Pre-Installation Conference.
B. Pre-Installation Conference:
    1. Convene a pre-construction conference to review roofing specifications and procedures with the architect, contractor, roofer and other trades relative to the work, prior to ordering materials.
    2. Applicator's truck foreman (Competent person on the job) must conduct survey of the roof's condition regarding the site specific fall protection plan and conduct Tail-Gate meeting on the first day on any new job site.

1.04 DELIVERY, STORAGE AND HANDLING

A. Delivery:
    1. Deliver materials to site intact with labels showing UL, ICC and CRRC listings, when in drums.
    2. Deliver so that stocks of materials on the site will permit un-interrupted progress of the work.
B. Storage and Handling:
    1. Adequately protect product against damage while stored at the job-site.
    2. Comply with manufacturer's instructions.

1.05 PROJECT/SITE CONDITIONS

A. Polyurethane foam shall not be sprayed during inclement weather and when the following conditions exist:
    1. If surface temperature is above 160 degrees F or below 40 degrees F or when the dew point is less than (5) degrees F above the surface temperature.
    2. If surface moisture is present.
    3. If wind velocity is above (12) miles per hour, windscreens are required.
    4. If wind velocity is at/or above (25) miles per hour, work shall be suspended.

1.06 WARRANTY

A. Warranty: Furnish written Ten (10) Year No Leak Warranty on Coated Foam Insulated Roof System. Warranty shall cover repairs necessary to maintain roofing work in a water-tight condition during the warranty period. Warranty is to cover workmanship and materials to maintain necessary repair work on a timely basis to ensure warranty term roof performance during the period covered, warranty shall cover all components of the Coated Foam Roof system only.

Part 2. PRODUCTS

2.01 MANUFACTURERS

A. US approved Coated Foam Roof System shall be manufactured by the following accepted manufacturer:
    1. SWD Urethane Company, Mesa, Arizona

2.02 MATERIALS

A. Primer/Sealer - Optional:
    1. Neoprene based primer formulated to be airless sprayed and designed expressly to enhance adhesion of SWD Urethane foam to various surfaces.
    2. SWD-1000 Primer/Sealer is acceptable.
    3. SWD – 2000 Primer / Sealer is acceptable in California.
B. Polyurethane Foam Roofing/Insulation:
    1. Two component rigid foam, designed to be applied with foam dispensing equipment, meeting the following Minimum Physical Properties:
        a. Primer /Sealer is not usually needed on new wood deck
        b. Primer/Sealer is almost always needed on metal deck and metal roof penetrations

PHYSICAL PROPERTIES

Property	ASTM Procedure	Values
Core Density, pcf nominal *	D- 1622	2.5 - 3.0
Compressive Strength, psi	D-2621	40.1
Tensile Strength, psi	D-1623	85.5
Open Cell Content, %	D-2856	17.7
Closed Cell Content %	D-2856	82.3
Water vapor transmission, per/inch	E-96	1.0
R Value	C- 177	6.8
k-Factor (initial)	C- 177	0.148

2. SWD 125 “Quik-Shield” polyurethane foam is acceptable.
        a. Polyurethane Foam Density and Compressive Strength shall be uniform and consistent with specification. Minimum Physical Properties shall not allow for multiple foam densities or compressive strengths to be spray-applied within multiple inches of specified foam.
        b. Polyurethane Foam shall contain EPA-approved 245fa blowing agent and meet U.S. non-ozone depleting requirements of the U.S. EPA

mandate and International MontrealProtocol. No polyurethane foam with phased-out HCFC 141b blowing agent is acceptable.

c. SWD Urethane Company, SWD 125 Polyurethane Foam with HFC 245fa "Enovate" blowing agent is acceptable

C. Protective Coating:

1. 100% acrylic elastomeric, UL 723, Class I rated, white coating meets EPA "Energy Star" and CRRC requirements for SolarReflectance and Thermal Emittance and can be applied by brush, roller or convention airless spray equipment with the following Minimum Physical Properties.

PHYSICAL PROPERTIES

a. Property	ASTM Procedure	Values
Fire Resistance	E-84	
Flame Spread	E-84	15
Smoke Developed	E-84	10
Solids Content		
By Weight	D-1353	70%
By Volume	D-2697	60%
Solar Reflectance	E-903	82%
Thermal Emittance	E-408	91%
Solar Reflectance Index, SRI	E-1980	103%
Tensile Strength: psi	D-412	280
Elongation psi	D-412	355
Water Vapor Transmission, ppi	E-96	1
(Perms @ 20 mils) Hardness		
Hardness: Shore A Durometer	D-2240	60
Colors:		Grey, Buff, White

ASTM D-6083 – Standard Specificiation for Liquid-Applied Acrylic Coating – Used in Roofing
(ALL FOLLOWING TESTS PASSED)
Liquid requirements/Film Properties:
Viscosity, Volume Solids, Weight Solids, Initial Tensil Strength, Initial Elongation, Premeance, Water Swelling, Wet Adhesion, Tear Resisitance, Fungi Resistance

Note: SWD Urethane Company is an original "Energy Star" partner and approved by CRRC.

a. Dry film thickness shall be (25) mils application with #9 limestone granules or #11 ceramic granules embedded at 3 0 Ibs per 100 square feet.
b. Base coat and top coat should be contrasting colors to ensure adequate thickness and coverage.
c. SWD Urethane Company "Kool-Kote"™ 1929F Acrylic Elastomeric Coatings are acceptable.

Part 3. EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:
    1. Roofing contractor shall examine the roof deck, flashings and other surfaces that are to receive roofing materials, prior to the application, to ensure that surfaces are dry, clean and in proper condition to receive the roofing system.
    2. All penetrations through roofing including drains, scuppers, miscellaneous pipe and vent penetrations and electrical conduits shall be completed prior to starting of work. Post-installation of penetrations after roofing section is completed requiring repairs, shall constitute costs added above contracted scope of work.
B. Application of roofing material shall constitute the roofing contractor's acceptance of surfaces and flashings to receive the materials.
C. Coordinate roof application with other work and trades which affect, connects with or will be concealed by this work.

3.02 PREPARATION

A. General Area:
    1. Notify the owner's representative and visitors to the job-site of potential fugitive overspray.
    2. Cars, etc. should be moved or covered to prevent inadvertent spraying. Contractor shall coordinate traffic with subcontractor during roof operations.
    3. Use appropriate barricading methods to shelter walking traffic from the work area's equipment and overspray.
    4. Mask work area as necessary to protect building walls, adjacent structures and vegetation, etc. from possible overspray.
B. Surface Preparation for Different Roof Decks:
    1. Built-up roof or other existing roofs (Retro-fit).
        a. All loose gravel, dust and residue shall be removed using power-vacuum equipment, power-sweeper, air-blowing or other suitable means. (Special conditions may be required if asbestos products are a part of roof removal.)
        b. The existing roof shall be thoroughly inspected for adhesion between felts, insulation and deck. Areas of poor adhesion, if any, should be fastened. Blisters, buckles, wrinkles and fish-mouths shall be cut out and/or fastened.
        c. Remove or re-fasten all loose base flashing, counter-flashing and gravel-stops, as required.
    2. Metal Deck:
        a. The metal roof deck shall be constructed of minimum 22-gauge steel. Construction shall conform to local building codes.
        b. Ferrous Metal: Sandblast iron and steel surfaces, which are not primed, shop-painted, or otherwise protected. Remove loose rust and primer from shop-primed iron and steel surfaces by scraping or wire brushing.

c. Non-Ferrous Metal : Clean galvanized metal, aluminum and stainless steel surfaces, as recommended by the manufacturer issuing the warranty.
d. If the metal surface is free of loose scale, rust, weathered or chalking paint, it can be cleaned using compressed air-jet, vacuum equipment, hand or powerbroom to remove loose dirt. Grease, oil or other contaminants shall be removed with proper cleaning solutions.
e. Fluted metal decks require a suitable method of covering or filling the flute prior to polyurethane foam application. Flutes may be covered with a suitable board stock, or quality (4) inch tape prior to spray-application of the polyurethane foam. Where a fire barrier is required, apply Type X gypsum board, mechanically-fastened to the metal surface, to meet local building code requirements.
f. Metal flutes 2 3/4 inches up to (3) in width, may be taped with 4" adhesive tape then sprayed with a minimum of 1 1/2 inches of foam.

3. Concrete Deck:
    a. Remove loose dirt, dust and debris by using compressed air, vacuum equipment or broom. Oil and grease from release agents or other contaminants shall be removed with proper cleaning solutions.
    b. All joint openings in concrete decks that exceed 1/4 inch shall be grouted or caulked by others, prior to application of polyurethane foam.
    c. Priming is required on concrete surfaces and it is recommended that due to hydration usually present in new concrete, poured concrete decks be permitted to cure for twenty-eight (28) days prior to the application of sprayed polyurethane foam. Cutting time off of (4) weeks is not a short cut SWD recommends.
    d. Sprayed polyurethane foam is not recommended for application over lightweight or insulating concrete materials unless underlayment and/or vent pans are installed. (Check with manufacturer prior to installation of PUF roof system over lightweight concrete).
4. Wood Deck:
    a. Deck must meet building code requirements for resistance to wind uplift.
    b. Plywood shall contain no more than 18% water, as measured in accordance with ASTM Standards. Plywood shall be exterior grade not less than 1/2" thick, nailed firmly in place.
    c. Plywood joints in excess of 1/4 inch, shall be taped or filled by others with a suitable sealant material, prior to application of polyurethane foam.
    d. Deck shall be free of loose dirt, grease, oil or other contaminants prior to priming or foam application. Remove loose dirt or debris by use of compressed air, vacuum or broom. No washing shall be permitted.
    e. Tongue & Groove Sheathing or Planking: Due to the frequency of joints, possibility of variable openings and effects of aging and shrinking, these surfaces must be overlaid with a minimum of 1/4 inch thick, exterior grade plywood or other suitable covering with a minimum (1) inch thickness.
5. Other Surfaces (i.e. Mineral Fiber Board, Gypsum Board)
    a. Such materials used over fluted metal decks must be installed with mechanical fasteners or adhesives.

b. Fasteners shall be installed to meet UL or Factory Mutual wind uplift criteria or the appropriate local building code criteria. Note: ICC uses a “Factor of 2” to qualify “Wind Uplift Resistance.” A UL Uplift Resistance of 160 pcf equals 80 MPH.
c. Boards shall be firmly butted together along edges without gaps or openings. Joints exceeding 1/4 inch shall be caulked by others with a suitable sealant material.
d. Care shall be taken to prevent mineral or gypsum board from getting wet in storage on the job-site and after installation, prior to being protected by foam. Moisture exposure may damage these materials and require replacement.
e. Remove loose dirt and debris by using compressed air, vacuum or broom. No power-broom is permitted due to possibility of damage.
f. Installed materials shall be protected from spills, contaminants, oil, grease and solvents, etc.

3.03 INSTALLATION - GENERAL

A. Install all materials in strict compliance with all published safety, weather or applicable instructions from the manufacturer and/or regulations of local, state and/or federal agencies, which have jurisdiction.
B. No work shall be commenced over defective area until advised in writing by architect of the action to be taken in such areas.
C. Spray polyurethane foam for new construction projects, shall be installed when the deck, parapet walls, rough openings and curbs are completed. The type of skylight used will determine when skylights should be installed. Plumbing vents (no lead), drains and electrical penetrations shall be in place prior to foam installation. No trades-people shall be allowed to work on the roof when the spray polyurethane foam and coatings are being installed- HVAC units shall not be installed until after the foam and coating roof system is in place.
D. Substrate shall have sufficient structural strength and integrity without substrate deformation, and sufficient slope-to-drain per code requirements of 1/4 inch/foot to eliminate excessive ponding water. Excessive ponding is defined as "an area of 100 square feet or more which holds in excess of 1/2" of water, as measured 48 hours after a rainfall" per The NRCA Roofing and Waterproofing Manual - Fourth Edition. Note: J-Bar and other metal counter-flashings are no longer required at the top foam edge on parapet walls.
E. Metal: Install metal foam-stop at all roof edges, as required. J-Bar and other counter-flashings are no longer required at the top horizontal foam edge across the parapet walls.
F. Crickets and Cants:
    1. Required drainage slope gradients are required to meet the various drainage sources.
    2. Crickets may be constructed as follows:
        a. Using 1/2 inch CDX plywood and structural lumber adhered mechanical1y to the substrate and vertical walls installed by others.
        b. Using spray polyurethane foam (within certain sloping requirements).
        c. Using tapered insulation board which shall be secured to the substrate with an adhesive recommended by the tapered board manufacturer or with mechanical fasteners.
    3. Cants formed with spray polyurethane foam shall transition from the deck surface up

the parapet wall.

G. Parapets:
    1. Polyurethane foam shall extend a minimum of (4) inches up to (12) inches up the vertical parapet wall at a thickness of 3/4 to 1 1/2 inches at the cant.
    2. If it is required that polyurethane foam extend all the way up the parapet wall then foam termination shall be detailed via straight line and tapered foam or optional sheet metal flashing that is acceptable to architectural standards.

3.O4 INSTALLATION – PRIMER/SEALER

A. All surfaces should be clean and free from moisture, oil, grease, loose particles, dust, debris and any other materials that shall prevent maximum adhesion.
B. Spray primer/sealer to decking at a rate of 1/2 gallon per 100 square feet.

3.05 INSTALLATION - POLYURETHANE FOAM

A. SWD 125 “Quik-Shield”® foam shall be applied in minimum 1/2 to 1 inch thick lifts to achieve the specified thickness ±1/4 inch per thickness.
B. Spray only the area each day that can be completed to the specified thickness that same day. Before resuming spraying operations on subsequent days, inspect the exposed leading edge of the foam for possible surface moisture that could cause blistering. The foam edge shall be considered dry when there is no indication of moisture when blotted with an absorptive material.
C. “Surface texture and quality-cured polyurethane foam shall range from a smooth to heavy orange peel" finish. Textures described as "popcorn or tree bark" surfaces, which exhibit crevices, voids and widespread defects, are not acceptable.

3.06 INSTALLATION - PROTECTIVE ELASTOMERIC COATING

A. Preparation:
    1. Foam surface and adjacent surfaces to be coated, shall be dry and completely free of degraded foam, foam over-spray, grease, oil, dirt or other contaminants which interfere with proper coating adhesion, dry and free of contaminants.
    2. Do not apply coating materials when surface temperature is less than 50 degrees F.
    3. Any physical damage to the polyurethane foam shall be repaired before coating.
    4. Operator should wear soft-soled shoes to avoid damaging the skin of the foam.
    5. An additional application of base coat shall be applied where foam surface has been sanded, planed or trimmed.
B. Application
    1. Base Coat:
        a. Shall be a contrasting color from the top coat to insure adequate coverage.
        b. Shall be applied on the same day, as the polyurethane foam application, when possible.
        c. The polyurethane foam shall be inspected for UV oxidation if more than (72) hours has elapsed prior to application of base coat.
        d. Spray-apply elastomeric base coat over insulation at the rate of (1) gallon per 100

square feet in one application.

2. Top Coat:
    a. Coating shall be a contrasting color from the base coat to ensure adequate coverage.
    b. Do not apply top coat until base coat has cured properly. Normally, 24 hours is sufficient time for the base coat to properly cure.
    c. Spray-apply acrylic elastomeric top coat over the base coat at the rate of two gallons per 100 square feet in one application.
    d. Coating passes shall be applied in cross-hatch pattern at right angles to base coat passes to ensure more uniform coverage.
    e. Coating shall extend up and over all polyurethane foam on vent pipes, parapets and other penetrations and shall terminate a minimum of (4) inches above the foam. All top coat termination points shall be straight-lined on parapet walls, vent pipes and other penetrations for effective use and uniform appearance.
3. Granules:
    a. Granules when specified, shall be broadcast into or on top of the wet top coating while it is being applied at the rate of 30 pounds per 100 square feet.
    b. Shall consist of #11 ceramic granules or #9 limestone granules.

3.07 CLEANING

A. Remove and dispose of excess materials, equipment and debris from premises during work and/or upon completion of work.
B. Leave work in clean condition in accordance with company policy and pride in a job well done.