SECTION 075713 - SPRAYED POLYURETHANE FOAM ROOFING

Continue to state quantities of work on the drawings. Any variance in the quantity of work will be negotiated by a field order or change order to the Contract.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section Includes:

Spray-applied, coated, polyurethane foam roofing.

Walkways.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project. The terms "applicator" and "installer," as used in this Section, are defined below; these terms are reversed in their usage by the SFPA's professional certification titles.

* + - * 1. Applicator: A qualified person employed to apply spray-applied, coated, polyurethane foam roofing.
				2. Installer: A qualified firm contracted to install spray-applied, coated, polyurethane foam roofing.

The definition below supersedes the definition in section 014216 for Company Field Advisor.

* + - * 1. Company Field Advisor; An individual meeting the requirements of either subparagraph below:

An employee of the company producing or manufacturing the system (or the company which lists and markets the primary components of the system under their name) who is certified in writing by the company to be technically qualified in design, installation, and servicing of the required products, and has experience in the installation of the required products. Personnel involved solely in sales do not qualify.

An individual employed by an organization (other than the company producing or manufacturing the system), certified in writing by the company producing or manufacturing the system, that the individual is technically qualified in design, installation and servicing of the required products and is capable to act as company field advisor in their behalf, and has experience in the installation of the required products. Personnel involved solely in sales do not qualify.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.

Attendees:

Director’s Representatives.

Contractor.

Roofing Applicator.

Review methods and procedures related to coated foamed roofing, including, but not limited to, the following:

Load limitations on in-place roofing.

Construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Surface preparation specified in other Sections.

Minimum curing period.

Forecasted weather conditions.

Special details and sheet flashings.

Repairs.

<**Insert agenda items**>.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.
				5. Submittals Package: Submit the shop drawings, product data, samples, and quality control submittals specified below at the same time as a package.
				6. Product Data: For each type of product.

Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties.

Revise the product data as necessary, to suit the requirements of this project.

The manufacturer’s written specification and application instructions shall form an integral part of this Section except as specified otherwise.

* + - * 1. Sustainable Design Submittals:
				2. Samples: For coated foamed roofing, prepared on Samples of size indicated below:

Samples, 24 by 24 inches, on rigid backing, showing polyurethane foam of thickness required and stepped coatings in colors required to illustrate buildup of coated foamed roofing.

Include Samples of auxiliary materials and accessories to verify color and finish selected.

* + - * 1. Quality Control Submittals

Applicator’s Certification : For SPFA-qualified applicators.

Furnish to the Director the names and address of five similar roofs which the foregoing firm has installed during the past three years.

Furnish a letter from the roof coating manufacturer certifying that the applicator is approved to apply the roofing system.

Optical Comparator: Provide optical comparator required under FIELD QUALITY CONTROL Article in PART 3 of this Section.

Retain "Product Certificates" paragraph below to require submittal of product certificates from manufacturers. Certificates may indicate certification that products have passed certain performance testing or compliance with standards, such as EnergyStar, GreenGuard, or other product certification programs.

Product Certificates: For each type of coated foam roofing.

Evaluation Reports: For coated foamed roofing, from ICC-ES.

Design Consultant to review code references and verify that the referenced sections/tables are current. Note that code references shall be based on the current version of the Uniform Code.

* + - * 1. Contract Closeout Submittals:

Warranty.

Maintenance Data: For coated foamed roofing to include in maintenance manuals.

* + - 1. QUALITY ASSURANCE
				1. Applicator’s Qualifications: A qualified coated-foamed-roofing installer who is approved, authorized, or licensed by coating manufacturer for installation of coating manufacturer's product over polyurethane foam.

The application of this system shall be performed by a firm regularly engaged in the application of such systems for at least 5 years.

Accreditation program in subparagraph below is a voluntary program administered by SPFA. Companies and individuals may receive accreditation. Participant lists are available from SPFA.

Engage an installer who participates in and who has fulfilled requirements of the SPFA program for company accreditation as "SPFA PCP Accredited Company Roofing," with individual applicator certification for personnel assigned to work on Project.

* + - * 1. Comply with recommendations in SPFA AY-104.
				2. Fire Hazard Classification: The urethane foam and elastomeric roofing system shall have a Class A rating when tested in accordance with ASTM E 108 or UL 790.
				3. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

Prepare mockups panel at the site before the roofing work commences.

Retain one of the next two subparagraphs.

Build mockup of sprayed on urethane insulation on a plywood panel to represent the specified insulation thickness, finish surface texture and quality required for the Work.

Build mockup of sprayed on urethane insulation and elastomeric coating on a plywood panel to represent the insulation thickness and finish and the elastomeric roofing thickness, adhesion and quality.

Size: 2 feet by 2 feet.

Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

Questions regarding the use of the article below should be directed to the Business Unit’s Roofing QIT Representative.

* + - 1. ROOFING MANUFACTURER’S COMPANY FIELD ADVISOR
				1. The manufacturer of the roofing system, issuing the final system guarantee on this roofing project, must supply a Company Field Advisor, as a technical representative, with the following minimum qualifications:

Five years of field experience on the same type of roofing system.

Ten projects where role was a Company Field Advisor; include contact names and phone numbers for each project.

Attendance at a roof specific instructional seminar within the last two years.

It is mandatory to discuss the use of the paragraph below with the Client, the Division of Construction, and perhaps the specified manufacturers, at project inception, particularly on downstate projects. There is a fee associated with the number of hours for a field advisor to be on a project. Include this additional cost in the project estimate beginning with the program estimate.

Edit number of days and hours below depending on size and complexity of project. Six days at 4 hours per day could work as a minimum for a simpler project. Six days or more, at more than 4 hours per day could work for a larger, more complex project.

* + - * 1. Secure the services of the Company Field Advisor for a minimum of<Insert Value> days at a minimum of <Insert Value>hours per day to inspect the workmanship of the roofing system installer.
				2. Company Field Advisor Duties and Responsibilities:

Become familiar with the Contract Documents and approved submittals prior to the pre-roofing conference.

Attend the pre-roofing conference and the beginning of the actual membrane installation for the purpose of:

Rendering technical assistance to the Contractor regarding installation procedures of the system.

Familiarizing the Director’s Representative with aspects of the system including inspection techniques.

Answering questions that might arise.

Edit remaining subparagraphs below to suit project complexity and need. Discuss appropriateness of subparagraphs with design Project Manager and the Division of Construction.

Attend each bi-weekly meeting.

Be objective, unbiased and impartial in each inspection, recommendation, conversation, action and written report.

Inspect and approve the existing substrate, flashing, blocking, and related materials as being acceptable for the installation of the roofing system.

Ensure proper fastening patterns and fastener sizes of wood blocking, insulation, edge flashing, and related components.

Immediately report non-compliant conditions, if any, to the Director’s Representative.

Provide to the Director’s Representative a written report, submitted prior to leaving the Project Site each day the Company Field Advisor is present. Each daily written report shall contain at a minimum:

Date of report and inspection.

Weather conditions at the start, middle, and end of the workday.

Work performed including Contractor activity, contractor crew size, supervisor’s name, area of activity, and progress and quality of the work as observed.

Discussions with Contractor regarding work anomalies and resolution.

Conditions that are not in compliance with the Contract documents.

Continue documenting non-compliance issues in subsequent reports until the issue has been resolved. Document resolution of non-compliance issues when resolved.

Report to the Director’s Representative in writing failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.

Confirm, after completion of the roofing work and based on the Company Field Advisor’s inspections and tests, that the Company Field Advisor has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver materials to Project site with manufacturer's name, product brand name and type, date of manufacture, shelf life, and directions for storing and mixing with other components.
				2. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by manufacturer.
				3. Remove and replace material that cannot be applied within its stated shelf life.
			2. FIELD CONDITIONS
				1. Do not execute the Work of this Section unless the substrate is fully cured, dry and acceptable for application in compliance with the specifications.
				2. Do not execute the Work of this section unless the Director’s Representative is present unless they direct that the Work be performed during their absence.
				3. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing work to be performed according to manufacturer's written instructions and warranty requirements.

Apply materials within the range of ambient and substrate temperatures recommended in writing by material manufacturers, but not below 50 deg F.

Apply materials within range of relative humidity recommended in writing by manufacturer of each component, but not when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.

Do not apply materials to damp or wet surfaces.

Do not apply primers, polyurethane foam, or coatings in snow, rain, fog, or mist, or when such weather conditions are imminent during the application and curing period.

Do not apply polyurethane foam when wind conditions result in surface finish textures not complying with requirements.

Do not apply coatings when wind conditions prevent uniform coating application.

* + - * 1. Moisture Protection: Keep the roof, including all flashings, penetrations and accessories, watertight.
				2. During the progress of the work every effort must be made to keep odors generated by the work from entering the building.

Coordinate the use of materials which could cause odors to permeate the building with the Directors Representative.

Shut off and wrap all air intakes in the vicinity of the work.

Ensure that all operable windows in the vicinity of the work area closed.

Equip each kettle with a fume recovery system. An after burner type system is not acceptable.

* + - * 1. Protection of Adjacent Surfaces:

Protect adjacent surfaces with tarps, plastic sheets, masking tape etc. as required to prevent damage and soilage.

Include the following on existing urethane foam roofs.

* + - * 1. Moisture Survey: Perform an infrared moisture survey to determine quantity and location of existing wet foam insulation.
			1. WARRANTY
				1. Special Warranty: Manufacturer agrees to repair or replace coated foamed roofing that does not comply with requirements or that does not remain watertight within specified warranty period.

Warranty Period: Five years from date of Substantial Completion.

1. PRODUCTS
	* + 1. SYSTEM DESCRIPTION
				1. Sprayed-in-place polyurethane foam insulation with elastomeric roofing coating and associated Work.
			2. MANUFACTURERS
				1. Source Limitations for Coated Foamed Roofing System: Obtain coating from single source from single manufacturer and polyurethane foam from single manufacturer acceptable in writing to coating manufacturer.
			3. PERFORMANCE REQUIREMENTS
				1. General Performance: Coated foamed roofing shall withstand exposure to weather without failure due to defective manufacture, installation, or other defects in construction. Membrane roofing shall remain watertight.

Material Compatibility: Provide polyurethane foam, coatings, substrate board, and auxiliary materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

* + - * 1. Fire-Test-Response Characteristics: Provide coated foamed roofing with the fire-test-response characteristics indicated, as determined by testing identical systems according to test methods below for deck type and slopes indicated by a qualified testing and inspecting agency that is acceptable to authorities having jurisdiction.

Class A roof covering according to ASTM E108.

Revise "Surface-Burning Characteristics" subparagraph below to suit Project. Compliance with flame-spread index is required by the BCNYS for foam plastic insulation; the BCNYS places no limit on smoke-developed index for roof applications.

Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Flame-Spread Index: 75 or less.

Retain "Fire-Resistance Ratings" subparagraph below only if products specified are part of a fire-resistance-rated assembly. Indicate rating, testing agency, and testing agency's design designation on Drawings.

Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

Retain "Wind-Uplift Resistance" paragraph below if coated foamed roofing is to be designed to withstand uplift pressure established by ASCE/SEI 7. This may be required if using substrate board or other material between the coated foamed roofing and substrate. Consult the Project Structural Engineer for determination of wind-uplift pressures. Indicate dimensions of perimeter and corners in subparagraphs below for simple roof shapes, or on Drawings.

* + - * 1. Wind-Uplift Resistance: Design roofing system to resist the following wind-uplift pressures when tested according to FM 4474, UL 580, or UL 1897:

Zone 1 (Roof Area Field): <**Insert lbf/sq. ft.** >.

Zone 2 (Roof Area Perimeter): <**Insert lbf/sq. ft.** >.

Location: From roof edge to <**Insert dimension**> inside roof edge.

Zone 3 (roof area corners): <**Insert** **lbf/sq. ft.** >.

Location: <**Insert dimension**> in each direction from building corner.

Retain "FM Approvals Listing" paragraph below if Project is FM Global insured or if FM Global requirements are used to set a minimum quality standard. Coordinate requirements of FM Global classification with other requirements in this Section. Replace FM Global-listing requirements with UL's wind-uplift and fire-test-response requirements if required for Project.

* + - * 1. FM Approvals Listing: Provide roofing system and component materials that comply with requirements in [**FM Approvals Standard 4450 for steel roof decks and** ]FM Approvals Standard 4470 for roof covers as part of a foamed roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

Retain one option in "Fire/Windstorm Classification" subparagraph below based on windstorm classification of Project. Verify availability of roofing systems that comply with retained classification.

Fire/Windstorm Classification: Class 1A-[**60**] [**75**] [**90**] [**105**] [**120**] <**Insert number**>.

Hail-Resistance Classification: [**MH**] [**SH**].

Retain first "Energy Performance" paragraph below for roofs that must comply with the EPA/DOE's ENERGY STAR requirements. The EPA/DOE's "ENERGY STAR Roof Product List" is available in PDF at http://downloads.energystar.gov/bi/qplist/roofs\_prod\_list.pdf.

* + - * 1. Energy Performance: Provide coated foam roofing that is listed on the EPA/DOE's "ENERGY STAR Roof Product List" for [**low]** [**steep**]-slope roof products.

Retain "Energy Performance" paragraph below for roofs that must comply with local "cool-roof" energy legislation; verify requirements with authorities having jurisdiction. Example and options below are for low-slope roofs on high-rise residential buildings, hotels, and motels that must comply with prescriptive approach of CCR Title 24 (California Building Standards Code).

* + - * 1. Energy Performance: Provide coated foamed roofing certified and labeled according to one of the following when tested according to CRRC-1:

Three-year, aged solar reflectance of not less than [**0.55**] <**Insert value**> and emissivity of not less than [**0.75**] <**Insert value**>.

Three-year, aged Solar Reflectance Index of not less than [**64**] <**Insert value**> when calculated according to ASTM E1980.

* + - 1. POLYURETHANE FOAM
				1. Polyurethane Foam: Rigid, cellular polyurethane; complying with ASTM C1029, Type III; spray applied, with fire retardants as required, and acceptable to coating manufacturer.

"In-Place Density" subparagraph below states the density range published in SPFA AY-104; revise to suit Project, or insert other attributes if required. Density requirement is not included in ASTM C1029.

In-Place Density: 2.8 to 3.0 lb/cu. ft.; ASTM D1622.

* + - 1. SILICONE COATINGS
				1. Silicone Coating: Liquid silicone elastomeric coating system specifically formulated for coating spray-applied polyurethane foam roofing.

Composition: Two-component silicone.

Base-Coat Color: Contrasting with topcoat.

Coordinate "Topcoat Color" and "Topcoat Color at Walkways" subparagraphs below with cool-roof energy performance requirement if any. Consult coating manufacturer for color and performance availability.

Topcoat Color: [**White] [Gray] [Tan] <Insert color**>.

Retain "Topcoat Color at Walkways" subparagraph below for walkways formed with additional coatings.

Topcoat Color at Walkways: [**White**] [**Gray**] [**Tan**] <**Insert color**>.

Silicone coatings are generally considered breathable and can have higher permeability than other coatings.

Vapor Permeance: Minimum [**5.0 perms**] at 20 mils thick according to ASTM E96, Desiccant Method, Procedure A.

* + - 1. SUBSTRATE BOARD

Retain one of three "Thermal Barrier" paragraphs below if required for coated foamed roofing used over steel deck as part of a fire-resistance-rated roofing assembly or if required to provide a plane surface to cover steel-deck flutes. The 2020 BCNYS stipulates 1/2-inch gypsum board or the requirements of the second paragraph below as a minimum. Insert other thermal barriers if applicable.

* + - * 1. Thermal Barrier: ASTM C1396, gypsum board [**1/2 inch] [Type X, 5/8 inch**] thick.
				2. Thermal Barrier: Board product tested according to and meeting the requirements of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

If retaining "Thermal Barrier" paragraph below, verify that it complies with BCNYS requirements for a thermal barrier.

* + - * 1. Thermal Barrier: Water-resistant gypsum board with fiberglass mat laminated to both sides, ASTM C1177, [**1/2 inch] [Type X, 5/8 inch**] <**Insert requirement**>.

Retain "Recover Board and Fasteners" paragraph below for re-roofing if a primer is inadequate and a recover board is recommended by polyurethane foam manufacturer for existing conditions. According to SPFA, usually only a primer is necessary.

* + - * 1. Recover Board and Fasteners: As recommended in writing by polyurethane foam manufacturer.
				2. Thermal-Barrier Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals Standard 4470 and designed and sized for fastening thermal barrier to substrate.
			1. AUXILIARY MATERIALS
				1. General: Auxiliary materials recommended in writing by roofing manufacturer for intended use.

Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

* + - * 1. Primer: Polyurethane-foam manufacturer's standard factory-formulated primer.
				2. Vapor Retarder: Bituminous membrane.

Base Sheet: Asphalt Saturated and Coated Organic Felt; ASTM D 2626.

Base Sheet Adhesive: Cold process, quick setting, cut-back, brush grade adhesive of the type used to apply cold process roofing felts.

Bitumen: Steep Asphalt; ASTM D 312, Type III.

* + - * 1. Mineral Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained by No. 40 sieve.

Color: [**Buff white] [Gray] [Green] [Red] <Insert color**>.

* + - * 1. Reinforcement: Flexible polyester or fiberglass mat of weight, type, and composition recommended in writing by coating manufacturer for embedment in liquid coating.
				2. Sheet Flashing and Accessories: Types recommended in writing by coated foamed roofing manufacturer, provided at locations indicated and as recommended.

Use paragraph below for securing base sheet to wood decks.

* + - * 1. Fasteners: Annular ring or screw type nails equal to “Simplex”, “Stronghold” or “Mazemade” roofing cap nails.
				2. Chlorinated Rubber Paint: FS TT-P-95, Type I.
				3. Rigid Insulation: Perlite Mineral Board; ASTM C 728.
1. EXECUTION
	* + 1. EXAMINATION
				1. Verify that related work is complete. Do not install coated foamed roofing until roof openings, curbs, and parapets, if any, are complete and roof drains, vents, and other roof penetrations are in place.
				2. Examine substrates, areas, and conditions under which coated foamed roofing will be applied, with Installer present, for compliance with requirements.
				3. Proceed with installation only after unsatisfactory conditions have been corrected and substrates are dry.

Retain two paragraphs below if substrate deck is new concrete.

* + - * 1. Proceed with installation only after minimum concrete curing and drying period recommended in writing by coated foamed roofing manufacturer.

Revise paragraph below to suit Project and manufacturer's requirements for moisture testing.

* + - * 1. Verify that concrete substrate is visibly dry and free of moisture. Test concrete substrate for capillary moisture by plastic sheet method according to ASTM D4263[ **at start of each day's work and**] at start of each roof area or plane. Do not proceed with roofing work if moisture condenses under the plastic sheet.
			1. SUBSTRATE BOARD

Retain this article if required.

* + - * 1. General: Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

Retain one of two "Thermal Barrier" paragraphs below for steel decks if a mechanically fastened thermal barrier is required.

* + - * 1. Thermal Barrier: Fasten to top flanges of steel deck according to recommendations in FM Global's "Approval Guide" and its FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
				2. Thermal Barrier: Fasten to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to coated foamed roofing manufacturer's written instructions.

Retain "Recover Board" paragraph below if required by coated foamed roofing manufacturer for re-roofing existing substrates. Verify fastener requirements for Project wind loads if retaining second option.

* + - * 1. Recover Board: Install according to coated foamed roofing manufacturer's written instructions. Fasten through existing roofing to roof structure as indicated. Space fasteners [**for wind-uplift conditions at Project site] [as indicated**].
			1. SURFACE PREPARATION
				1. General: Clean and prepare substrate according to coated foamed roofing manufacturer's written instructions. Provide clean, dust-free, dew-free, and dry substrate for coated foamed roofing application.
				2. Remove grease, oil, form-release agents, curing compounds, and other contaminants from substrate.

Retain first paragraph below for re-roofing.

* + - * 1. Prepare substrate for re-covering according to coated foamed roofing manufacturer's written instructions.
				2. Cover and mask adjoining surfaces not receiving coated foamed roofing to prevent overspray or spillage affecting other construction. Temporarily close off roof drains, removing roof-drain plugs when not doing coated foamed roofing work or when rain is forecast.

Retain subparagraph below to obtain clean termination lines after coating.

Remove masking after polyurethane foam application; cover and re-mask adjoining surfaces before coating polyurethane foam.

Verify priming needs with polyurethane foam manufacturers. Concrete, plywood, and some steel decks may require priming.

* + - * 1. Prime substrate as recommended in writing by coated foamed roofing manufacturer.
				2. Fill, cover, or tape joints and cracks in substrate that exceed a width of 1/4 inch. Remove dust and dirt from narrower joints and cracks before applying polyurethane foam.
				3. Patching Deteriorated Felts: Cut off and remove existing deteriorated felts down to firmly bonded, sound surfaces. (Deteriorated Felts: Felts which are wet, rotted, loose, blistered).

Patch the defective areas with one ply of base sheet set in a solid bed of adhesive. Where felt removal exposes wet or deteriorated insulation, remove the insulation and fill the void level with the surrounding roof surface with insulation set in adhesive. Patch the area with one ply of base sheet set in adhesive. Extend the base sheet a minimum of 6 inches onto the existing membrane. Prime the repaired area immediately with rubber paint.

Use subparagraph below for repairing large areas.

Apply one ply of base sheet over the entire area shown on the drawing. Embed the base sheet in a full hot mopping of steep asphalt applied at the rate of 30 lbs. per sq. Lap ends and edges a minimum of 4 inches. Broom in the base sheet to insure good wrinkle free adhesion. Prime the base sheet immediately with rubber paint.

* + - * 1. Patching Existing Vapor Barrier: Remove deteriorated and damaged portions of the existing vapor barrier. Remove portions of the vapor barrier that are not firmly bonded to the deck. Patch the defective areas with one ply of base sheet set in a solid bed of adhesive. Extend the patch a minimum of 6 inches beyond the defect. Prime the patched area immediately with rubber paint.

Retain paragraph below if roofing system requires a vapor retarder; revise to suit Project.

* + - * 1. Installing Vapor Barrier: Remove deteriorated and damaged portions of the existing vapor barrier. Remove portions of the vapor barrier that are not firmly bonded to the deck. Prime the existing vapor barrier and exposed portions of the deck with asphalt primer applied at the rate of one gal. per square.

Over the existing vapor barrier apply one ply of base sheet. Embed the base sheet in a full hot mopping of steep asphalt applied at the rate of 30 lbs. per square. Lap ends and edges a minimum of 4 inches. Broom in the base sheet to insure good wrinkle free adhesion.

Immediately prime the vapor barrier with a uniform coating of rubber paint. Do not allow the vapor barrier to stand unprotected overnight.

Use paragraph below for complete removal of existing roofing over wood deck.

* + - * 1. Installing Base Sheet Over Wood Decks: Install one ply of base sheet over the entire wood deck surface. Apply adhesive to the contact surfaces at laps and end joints. Lap ends and edges a minimum of 4 inches. Nail the base sheet 12 inches o.c. staggered in all directions and 9 inches o.c. along edges and end laps.

Immediately prime the base sheet with a uniform coating of rubber paint. Do not allow the base sheet to stand unprotected overnight.

* + - 1. COATING APPLICATION
				1. Allow polyurethane foam substrate to cure for a minimum of two hours before coating and apply coating system to polyurethane foam no later than 24 hours after applying the foam. Remove dust, dirt, water, and other contaminants before applying coating system.
				2. Apply coating system to polyurethane foam by spray, roller, or other suitable application method according to coating manufacturer's written instructions.

Foam Surface: Finished foam surface shall be smooth and free of voids, crevices or pinholes. The finished surface must average between “Orange Peel” and “Verge of Popcorn.” “Popcorn” or rougher surfaces will not be accepted.

* + - * 1. Apply base coat and one or more topcoats to obtain a uniform, seamless membrane free of blisters and pinholes. Apply each coat at right angles to preceding coat, using contrasting color tints for successive coats.

Apply topcoat(s) after removing dust, dirt, water, and other contaminants from base coat.

Silicone Coating: Apply coating system to a minimum dry film thickness of 20 mils.

* + - * 1. Height at Terminations: Apply coating system at wall terminations and other vertical surfaces to extend vertically beyond polyurethane foam by a minimum of 4 inches.
				2. Installing Additional Foamed-In-Place Urethane: Where indicated on the drawings and/or where directed, apply additional urethane foam at low areas to minimize water ponding. At large areas requiring additional foam, form the foam into crickets by installing the foam in 1/2-inch thick stepped layers to achieve the thickness required or shown on the drawings. After the cricket has been fashioned spray the specified foam thickness over the cricket.
				3. Building-In Gravel Stops:

Install the gravel stop over the cured 20 mil base coat. Set the flange of the gravel stop into a brush application of the silicone coating.

Strip in the gravel stop flange with one ply of glass fabric embedded in and coated with silicone coating.

Use paragraph below where ice formation is expected.

* + - * 1. Installing Perimeter Reinforcing: After gravel stop is installed and stripped in, apply an additional 3 foot wide strip of glass fabric embedded in and coated with silicone coating. Apply coating to completely hide the glass fabric.

Edit paragraph below for new drains.

* + - * 1. Building-In Roof Drains: At existing roof drains remove the clamping ring and dome strainer. Install flashing consisting of two plies of glass fabric embedded in and coated with silicone coating. Extend the flashing into the drain body and over the roof surface a minimum of one foot. Reinstall the clamping ring and strainer.
				2. Installing Flashing at Building Walls and at Penetrations Thru the Roof: Provide flashings as detailed. Where not shown extend the foam and coating up behind cap flashings. Where there is not cap flashing carry the foam up the vertical surfaces and extend the coating beyond the foam. Terminate the coating in neat, straight lines.

Use paragraph below when aesthetics are important.

* + - * 1. Installing Elastomeric Finish Coat and Granular Surfacing: After flashings have been installed and applied coatings have cured tack free. While the finish coating is still wet, uniformly broadcast ceramic granules into the wet coating at the rate of 50 lbs. per square. The granules must be installed within 5 minutes of the coating application and must completely hide the coating.

Color of granules shall be as close as possible to the color of the finish coating.

* + - * 1. Mineral Granules: Apply mineral granules over wet topcoat, using pressure equipment at the rate of 0.5 lb/sq. ft. Remove excess granules after topcoat has cured.
				2. Sealant: Apply sealant to perimeter and other terminations where indicated on Drawings or required by coated foamed roofing manufacturer.

Retain "Walkways" paragraph below if required. Use paragraph below for Heavy Traffic traffic areas (smooth surface roofs only).

* + - * 1. Walkways: Install roof walkways in pattern and locations indicated and as follows:

Granule-Coated Walkways: Mask off completed coating adjacent to walkways and apply one or two additional topcoats to achieve a minimum dry film thickness recommended in writing by coated foamed roofing manufacturer. Spread mineral granules uniformly at a rate of 0.5 lb/sq. ft. into final wet coating. Remove masking and excess granules after topcoat has cured.

* + - 1. FIELD QUALITY CONTROL
				1. Optical Comparator: Prior to start of this project, purchase and deliver to the Director’s Representative two “Edscorp Optical Comparators” Model No. 41,055 with Recticle No. 0, 585 as distributed by Edmund Scientific Co.
				2. After the base and topcoat has cured and before the finish coat is applied, check the dry film thickness with the optical comparator. Check the dry film thickness where directed by the Director’s Representative. Location of test cuts will include suspected “thin” areas and “randomly” selected areas. All test cuts must be made in the presence of the Director’s Representative. Do not proceed with the application of the finish coat until these tests have been made.
				3. Apply additional elastomeric coating at all areas which are not 20 dry mils thick.
				4. Patch all cuts and removal spots required to perform the tests with elastomeric coating, restore the membrane to full integrity and surface uniformity.
			2. REPAIR AND RE-COATING
				1. Correct deficiencies in, or remove, foam or coatings that do not comply with requirements; fill and repair substrates and reapply materials.
				2. Repair of Urethane Foam Roofing:

Determine type of existing coating before specifying repair method and type of coating

Power wash the entire roof surface. Do not power wash debris or granules into roof drains.

Perform a moisture survey to determine the size and location of any wet insulation.

Delete the following subparagraph if scarifying is not required

Scarify the entire roof surface.

Remove all wet foam insulation down to the substrate and fill voids with sprayed polyurethane foam.

Vacuum the entire roof surface.

Installing Elastomeric Finish Coat and Granular Surfacing: Apply the finish coat at the rate of 1.5 gallons per 100 square feet or as required by the manufacturer for the specified warrantee. While the finish coating is still wet, uniformly broadcast ceramic granules into the wet coating at the rate of 50 lbs. per square. The granules must be installed within 5 minutes of the coating application and must completely hide the coating.

Color of granules shall be as close as possible to the color of the finish coating.

* + - 1. CURING, PROTECTING, AND CLEANING
				1. Cure coatings according to manufacturer's written instructions, taking care to prevent contamination and damage during application stages and curing. Do not permit traffic on uncured coatings.
				2. Protect coated foamed roofing from damage and wear during remainder of construction period.
				3. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 075700