SECTION 07 01 50.19 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof tear-off.
2. Partial roof tear-off.
3. Removal of base flashings.

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Existing Membrane Roofing System: Built-up asphalt, Spray-Polyurethane Foam (SPF) membrane roofing systems, membranes, roof insulation, surfacing, and components and accessories between deck and roofing membrane.

C. Roof Tear-Off: Removal of existing membrane roofing system from deck.

D. Partial Roof Tear-Off: Removal of a portion of existing SPF membrane roofing system, including underlying roofing materials from deck.

E. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

F. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.4 SUBMITTALS, GENERAL

A. General: Submit all informational submittals required by this Section concurrently.

1.5 INFORMATIONAL SUBMITTALS

A. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.6 CLOSEOUT SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of hazardous wastes, such as asbestos-containing material, by a landfill facility licensed to accept hazardous wastes.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Installer of new membrane roofing system or SPF roofing system, licensed to perform asbestos abatement in the State or jurisdiction where Project is located.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect; testing and inspecting agency representative; roofing system manufacturer's representatives; roofing systems Installers including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing systems including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing system tear-off and replacement including, but not limited to, the following:

    a. Reroofing preparation, including membrane roofing or SPF roofing system manufacturer's written instructions.
    b. Transition details between SPF and membrane roof systems.
    c. Temporary protection requirements for existing roofing system that is to remain during and after installation.
    d. Existing roof drains and roof drainage during each stage of reroofing, and roof drain plugging and plug removal requirements.
    e. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to make progress.
    f. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
    g. Structural loading limitations of deck during reroofing.
    h. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
    i. HVAC shutdown and sealing of air intakes.
    j. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
    k. Asbestos removal and discovery of asbestos-containing materials.
    l. Governing regulations and requirements for insurance and certificates if applicable.
    m. Existing conditions that may require notification of Architect before proceeding.

1.8 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

1. A roof moisture survey of existing membrane roofing system is available for Contractor's reference and attached to specification Section 07 57 50 – Coated Foamed Roofing Restoration.

2. The results of an analysis of test cores from existing membrane roofing system are available for Contractor's reference and indicated on the Drawings.

E. Handle and store materials and place equipment in a manner to avoid deflection of deck, overloading, and possible disturbance to the building structure.

F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

G. Hazardous Materials: Present in building to be reroofed. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except according to procedures specified elsewhere in the Contract Documents.
3. Coordinate with hazardous material remediation subcontractor to prevent water from entering existing roofing system or building.

PART 2 - PRODUCTS

2.1 AUXILIARY REROOFING MATERIALS

A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new SPF and membrane roofing systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing membrane roofing system that is indicated not to be reroofed.

1. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
2. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.

B. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

C. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

1. Test, verify and confirm existing roof drains are operational and document conditions at each roof drain in writing prior to beginning work.

D. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

E. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

F. Beginning reproofing preparation constitutes Contractor’s acceptance of substrates and conditions.

3.2 ROOF TEAR-OFF

A. General: Notify Owner each day of extent of roof tear-off proposed for that day.

B. Remove loose aggregate from aggregate-surfaced built-up bituminous roofing using a power broom. Remove loose granules from granular-surfaced Spray Polyurethane Foam roofing using vacuum.

C. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove roof insulation, cover and substrate boards, vapor retarder membranes, wood blockings, fasteners, flashings, fascias, etc.

2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
3. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
4. Remove fasteners from deck.

D. Partial Roof Tear-Off: Where indicated, remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove roof insulation and underlying roofing materials between (SPF) roof insulation and roof deck.
2. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.
3. Remove excess asphalt from steel deck. A maximum of 15 lb/100 sq. ft. of asphalt is permitted to remain on steel decks.
4. Remove fasteners from deck.

3.3 DECK PREPARATION

A. Inspect deck after tear-off, or partial tear-off of membrane roofing system.

B. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.

C. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.4 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants such as SPF and coatings, asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are indicated to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish as specified in Division 07 Section "Roof Specialties."

C. Inspect parapet sheathing for deterioration and damage. If parapet sheathing has deteriorated, immediately notify Architect.

3.5 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 07 01 50.19

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Insulation for miscellaneous voids.

1.3 SUBMITTALS, GENERAL

A. General: Submit all action submittals required by this Section concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Adhesive for bonding insulation.

B. As-Specified Data: If the product to be incorporated into Project is as specified by manufacturer name and product designation in Part 2 of this Specification Section, submit the "**As-Specified Verification Form**" (attached to Division 01 Section "Submittal Procedures") for each item listed below, otherwise submit full Product Data for the following:

1. Insulation for miscellaneous voids.

C. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Spray Polyurethane Foam Insulation for Miscellaneous Voids: ASTM C 1029, Type II, closed cell, minimum density of 1.75 lb/cu. ft. and minimum aged R-value at 1-inch thickness of 6.0 deg F x h x sq. ft./Btu at 75 deg F, with maximum flame-spread and smoke-developed indexes of 25 and 400, respectively, per ASTM E 84.

a. Basis-of-Design Product: Subject to compliance with requirements, provide DuPont; Froth-Pak Foam Insulation, or comparable product.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

1. Adhesives shall have a VOC content of 70 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the Work.
B. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation, or that interfere with insulation attachment.
C. Proceed with installation only after unsatisfactory conditions have been corrected.
D. Beginning installation constitutes Contractor’s acceptance of substrates and conditions.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation for Miscellaneous Voids: Apply according to manufacturer's written instructions.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 57 50 - COATED FOAMED ROOFING RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Examination of existing conditions.

2. Preparation for restoration:

   a. Areas for removal and replacement.
   b. Areas for correcting poor drainage.
   c. Areas for recoating.

3. Spray-applied, coated, polyurethane foam roofing.

4. Substrate board.

5. Polyurethane foam.

6. Silicone coatings.

7. Accessory materials including sealants, reinforcement and walkways.

1.3 DEFINITIONS

A. Applicator: A qualified person employed to apply spray-applied, coated, polyurethane foam roofing.

B. Installer: A qualified firm contracted to install spray-applied, coated, polyurethane foam roofing.

C. Removal and Replacement (minimum 12” square area): Removal of existing coated foamed roofing system and underlying roofing materials down to deck and replacement with coated foamed roofing restoration system to elevation as required to eliminate ponding and create positive drainage. Dispose items of existing construction off-site. A partial removal of the existing roof system is required. Roof areas requiring removal shall be as identified by roof inspection and the roof scan drawings attached to this section.

D. Recoating With Additional Foam Thickness to Correct Poor Drainage/Ponding: Removal of existing coating and scarify foam below coating and replacement with additional foam and silicone coating system. Coating removal and replacement includes removal and replacement of up to 1-inch depth of existing polyurethane foam. Roof areas requiring additional foam thickness to correct drainage/ponding are identified on the drawings. Additional removal and replacement as described herein may also be necessary. Dispose items of existing construction off-site.

E. Recoating: Preparation of existing coating and recoating with silicone coating system. Coating preparation includes: Power washing existing roof surface per coated foamed roofing system manufacturer's requirements, cleaning and removal of all loose materials, foreign materials, oils, algae, blisters and delaminated or non-compatible coatings, etc. from roof surface, repairing foam substrate and providing reinforcing mesh at all cracks, seams and expansion joint locations.

F. Reinforcement: Flexible polyester or fiberglass reinforcing mat of weight, type, and composition recommended in writing by coating manufacturer for embedment in liquid coating.

G. Self-Sealing Tape: Butyl rubber compound with an absorbent polyester fleece face, flexible, moldable product applied to prepared substrates used to seal surfaces and prevent moisture intrusion.

H. Walkways: Coating and granule system approved by coating manufacturer.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Construction Manager, testing and inspecting agency representative, coated foamed roofing Installer, coated foamed roofing Installer's superintendent, coated foamed roofing system manufacturer's technical representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

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

    a. Previously-conducted moisture survey.
    b. Areas of poor drainage requiring correction.
    c. Existing conditions that may require Architect notification before proceeding.
    d. Load limitations on in-place roofing.
    e. Construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress.
    f. Surface preparation including removal of blisters and delaminated coatings.
    g. Locations requiring reinforcement.
    h. Minimum curing period.
    i. Forecasted weather conditions.
    j. Special details including reinforcing mesh, self-sealing tape, sheet flashings, sealants and sealant filled 'V' groove detail.

k. Temporary protection requirements for coated foamed roofing work during and after installation.
l. Building occupancy, HVAC and equipment shut-downs, noise levels, and other items that may affect building occupants and those on or near the site.
m. Corrective measures.

1.5 SUBMITTALS, GENERAL

A. General: Submit all action submittals and informational submittals (except field quality-control reports) required by this Section concurrently.

1.6 ACTION SUBMITTALS

A. 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.

1. Substrate board.
2. Polyurethane foam.
3. Silicone coatings.
4. Mineral granules.
5. Primers.
6. Silicone sealants.
7. Reinforcing mesh.
8. Self-sealing tape.
9. Walkways.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Locations of each type of restoration work.
2. Layout of poor drainage/ponding areas requiring correction.
3. Reinforcing locations and details at expansion joints, cracks and wall base flashings.
4. Flashing details at terminations, edges and penetrations.
5. Walkway layout.

C. Samples: For each type of exposed product, finish, and color.

1. Include Samples of accessory materials and accessories involving color and finish selection.

D. Sample Warranties: For special warranty and special Project warranty.

1.7 INFORMATIONAL SUBMITTALS

A. Performance Requirement Certificate: Signed by coated foamed roofing manufacturer, identifying all roof system components and certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of complying with performance requirements.

B. Special Warranty Certificate: Signed by coated foamed roofing manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

C. Field quality-control reports.

1.8 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coated foamed roofing to include in maintenance manuals.
B. Executed Warranties: For special warranty and special Project warranty.

1.9 QUALITY ASSURANCE

A. Installer 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.

1. 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.

B. Comply with recommendations in SPFA AY-104.

1.10 DELIVERY, STORAGE, AND HANDLING

A. 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.
B. Store materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by manufacturer.
C. Remove and replace material that cannot be applied within its stated shelf life.

1.11 FIELD CONDITIONS

A. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

1. A roof moisture survey of existing roofing system is attached to this Section. It is provided for Contractor’s convenience and information but is not a warranty of existing conditions. It is intended to supplement rather than serve in lieu of Contractor’s own investigations.

2. A site visit/roof inspection by the contractor/installer prior to submitting bids is strongly recommended.

B. Protect adjacent construction, buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from operations.

C. 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.

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

2. Apply materials within range of relative humidity recommended in writing by manufacturer of each component, but not when relative humidity exceeds 80 percent, or when temperatures are less than 5 deg F above dew point.

3. Do not apply materials to damp or wet surfaces.

4. 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.

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

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

1.12 COORDINATION

A. Coordinate construction operations on or adjacent to roof, included in different Sections, which depend on each other for proper installation, connection, and operation.

1.13 WARRANTY

A. Special Warranty: Manufacturer agrees to correct or replace, without monetary limitation, coated foamed roofing that does not comply with requirements or that does not remain watertight within specified warranty period.

1. Warranty Period: Non-prorated 15 years from date of Substantial Completion.

B. Special Project Warranty: Roofing Installer agrees to correct or replace, without monetary limitation, coated foamed roofing work as necessary to correct faulty and defective work and as necessary to maintain work in a watertight condition. This warranty, signed by the coated foamed roofing Installer, covers the Work of this Section, including all components of coated foamed roofing system such as polyurethane foam, silicone coating, and accessory materials, for the following warranty period:

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain coating and polyurethane foam from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Coated foamed roofing to withstand exposure to weather without failure due to defective manufacture, installation, or other defects in construction. Membrane roofing to remain watertight.

1. Material Compatibility: Provide polyurethane foam, coatings, and accessory 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.

B. 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.

1. Class A roof covering according to ASTM E108.

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

a. Flame-Spread Index: 75 or less.

C. Wind-Uplift Resistance: Provide roof assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90.

D. Structural Performance: Provide roof assemblies capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

E. FM Approvals Listing: Provide roofing system and component materials that comply with requirements in 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.

1. Fire/Windstorm Classification: Class 1A- 90.
2. Hail-Resistance Classification: MH.

2.3 SUBSTRATE BOARD

A. Glass Mat Gypsum Thermal Barrier: Water-resistant gypsum board with fiberglass mat laminated to both sides, ASTM C1177/C1177M, Type X, 5/8 inch.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Georgia-Pacific Gypsum, LLC; DensDeck Prime Roof Board, or comparable product.

B. Thermal-Barrier Fasteners: Factory-coated steel fasteners and metal plates complying with corrosion-resistance provisions in FM Approvals Standard 4470, and designed and sized for fastening substrate to steel roof deck.

1. Provide white fasteners where underside of roof deck will remain exposed to view.

2.4 POLYURETHANE FOAM

A. Polyurethane Foam: Rigid, cellular polyurethane; complying with ASTM C1029, Type III or Type IV; spray applied, with fire retardants as required, tested as part of an assembly that passes UL 1256, UL 790, Class A listings for roof assemblies – exterior fire/non-combustible decks up to unlimited thickness of SPF and acceptable to coating manufacturer.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Progressive Materials, LLC, New Albany, IN; “Pro Poly Foam HFO 4330 Series Spray Polyurethane Foam”, or comparable product, including, but not limited to, products by:

   a. Carlisle Construction Products, Cartersville, GA. (SealTite PRO Closed-Cell Spray Foam).
   b. Gaco, a brand of Firestone Building Products, Waukesha, WI. (GacoRoofFoam).

2. In-Place Density: 2.9 to 3.0 lb/cu. ft.; ASTM D1622.

3. Compressive Strength: 55-65 psi; ASTM D1621.

4. Closed-Cell Content: percent, min. 94%, ASTM D-6226.

5. K-factor: 0.158, ASTM C-518.

6. Dimensional Stability: <4%, ASTM D-2126.

7. Thermal Resistance (R-Value): Minimum aged R-value at 1-inch thickness of 6.3 deg F x h x sq. ft./Btu at 75 deg F.

8. Flame Spread: max. <25, ASTM E84.

9. Smoke Development: <450, ASTM E84

2.5 SILICONE COATINGS

A. Silicone Coating: Liquid silicone elastomeric coating system specifically formulated for coating spray-applied polyurethane foam roofing.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Progressive Materials, LLC, New Albany, IN; “HS 3200 – BX Series Silicone Roof Coating with additives to deter wildlife damage”, or comparable product, including, but not limited to, products by:

   a. Carlisle Roof Foam and Coatings, Cartersville, GA.
   b. Gaco, a brand of Firestone Building Products, Waukesha, WI.

2. Composition: One-component silicone.

3. VOC Content Limit: 50 g/L.

4. Flame Spread: ASTM E-108, Class A.

5. Base-Coat Color: Contrasting with topcoat.

6. Topcoat Color: Light Gray.

2.6 ACCESSORY MATERIALS

A. General: Accessory materials recommended in writing by roofing manufacturer for intended use.

1. Liquid-type accessory materials must comply with VOC limits of authorities having jurisdiction.

2. Sealants shall comply with the following limits for VOC content:

   a. Nonmembrane Roof Sealants: 300 g/L.
   b. Sealant Primers for Nonporous Substrates: 250 g/L.
   c. Sealant Primers for Porous Substrates: 775 g/L.

B. Primer: Polyurethane-foam manufacturer's standard factory-formulated primer similar to: “P-100 General Purpose Primer” by Progressive Materials, New Albany, IN.

C. 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 and composition recommended in writing by coating manufacturer for embedment in liquid coating similar to: “3M #11 9300 Roofing Granules” by 3M Corporation, St. Paul, MN.

1. Color: White.

D. Reinforcement: Flexible polyester or fiberglass reinforcing mat of weight, type, and composition recommended in writing by coating manufacturer for embedment in liquid coating similar to; “PF 200 Polyester Fabric”, width as indicated on Drawings, by Progressive Materials, LLC, New Albany, IN.

E. Self-Sealing Tape: Butyl rubber compound with an absorbent polyester fleece face, flexible, moldable product applied to prepared substrates used to seal surfaces and prevent moisture intrusion recommended in writing by coating manufacturer for sealing substrate surfaces similar to; “FT 500 Butyl Fleece Tape” by Progressive Materials, LLC, New Albany, IN.

F. Walkways: Coating and granule system approved by coating manufacturer. Provide as indicated on Drawings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Progressive Materials, LLC, New Albany, IN; “PG 700 Pro-Grip Safety Yellow Walkway Coating” and “PG-750 Pro-Grip Non-Slip Safety Yellow Walkway Granules”, or comparable product, including, but not limited to, products by:

a. Carlisle Roof and Foam Coatings, Cartersville, GA.
b. Gaco, a brand of Firestone Building Products.

G. Sealant: ASTM C920, Class 35, Use NT, Grade NS, Type S, one-component, neutral- or acid-curing silicone, and as recommended in writing by coated foamed roofing manufacturer for substrate and joint conditions and for compatibility with roofing materials similar to; “SS 300 Series Professional Grade Silicone Sealant” by Progressive Materials, LLC, New Albany, IN.

1. Color: Light Gray – SS 303.

H. Sheet Flashing and Accessories: Types recommended in writing by coated foamed roofing manufacturer, provided at locations indicated and as recommended.

I. Roof Specialties and Roof Accessories: See applicable Division 07 specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. 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.

B. Examine existing coated foamed roofing system, substrates, areas, and conditions under which coated foamed restoration will be performed, with Installer present, for compliance with requirements. Submit inspection report to coated foamed roofing manufacturer detailing any deficiencies in the existing system.

C. Identify and mark all areas of existing coating and/or insulation found to be wet, loose, blistered, delaminated, cracked, contaminated or not suitable for re-coating. Identify and mark all existing joints, cracks, terminations with cracks and expansion joint and base of wall locations to be reinforced.

D. Verify roof slope prior to beginning installation. There is to be no single area of standing water on the roof 24 hours after a rain, greater than 100 sq. ft. and more than ½” deep.

E. Proceed with installation only after unsatisfactory conditions have been corrected and substrates are dry, in accordance with coated foamed roofing manufacturer's instructions.

F. At tie-ins/transitions between SPF and Single-Ply Membrane roof systems, coordinate with single-ply membrane roof installer to allow completion of single-ply membrane roof terminations to be completed prior to SPF transition which may overlay single-ply termination.

G. Beginning installation constitutes Contractor's acceptance of substrates and conditions.

3.2 SURFACE PREPARATION

A. General: Power wash existing roof surface per coated foamed roofing system manufacturer's requirements. Clean and prepare substrate according to coated foamed roofing manufacturer's written instructions. Provide clean, dust-free, dew- and condensation-free, and dry substrate for coated foamed roofing application.

1. Existing roof shall be inspected for any areas of wet insulation, blisters, coating delamination or non-compatibility and areas of poor drainage; they shall be marked on roof and roof plan for remediation.

2. Inspection of existing roof, identification and correction of conditions requiring remediation are the contractor's responsibility.

3. Identification and removal of all wet materials are the contractor's responsibility. A moisture capacitance meter shall be used to confirm wet materials requiring removal and dry materials allowed to remain.

B. Remove grease, oil, form-release agents, curing compounds, and other contaminants from substrate.

C. Prepare substrate for restoration according to coated foamed roofing manufacturer's written instructions.

1. For areas where coatings, foamed insulation and underlying roofing materials are indicated for removal and replacement (minimum 12" square area, at random wet area locations where multiple wet areas are clustered, larger areas of removal and replacement are acceptable at contractor's option).

a. Remove coating, loose granules, and debris.

b. Remove any wet, damp, or otherwise defective insulation, including underlying roofing materials, down to roof deck, to a level and renewable condition ready to receive mechanically-attached substrate board and polyurethane foam insulation to match thickness of adjacent insulation at transitions and to elevation as required to eliminate ponding and create positive drainage.

2. For areas requiring recoating with additional foam thickness to correct poor drainage/ponding:

a. Remove coating, loose granules and debris.

b. In addition to coating removal, remove up to 1-inch depth of existing polyurethane foam insulation by a roof scarfer to a level and renewable condition, ready to receive additional polyurethane foam insulation to re-slope for positive drainage.

3. For areas indicated for recoating:

   a. Remove by vacuum, loose granules and debris.

   b. Remove all foreign materials, loose materials, oils, algae, etc. and clean roof surface.

   c. After cleaning, inspect existing coating for adherence to substrate. If found to be blistered or loose, follow instructions listed in items 2a and 2b above.

   d. At existing joints, cracks, terminations with cracks and expansion joint locations:

      1. After surface preparation, install base coat of silicone – approximately 25 mils.
      2. Embed appropriate width flexible mat reinforcing mesh.
      3. Encapsulate top of mesh with silicone.
      4. Cover entire detail with same thickness silicone coating as the remainder of the roof.

4. Existing wall/parapet/penetration base flashings and terminations:

   a. Remove all loose material and debris, patch and prepare substrate with compatible materials to provide an acceptable substrate for application of roof recoating materials.

   b. At base flashing locations with metal counter flashings:

      1. Bend existing counter flashing upward to provide access for sealing roof membrane to wall or penetration/curb. At termination locations with cracks, follow instructions as listed in 3d above. After completion of roof to wall termination, reposition metal counter flashing and seal face of counter flashing to wall or penetration/curb.

   c. At parapet locations with masonry coping cap:

      1. Remove all mastic, sealants and loose joint materials.
      2. Clean all surfaces, mask leading exposed exterior edge to create a crisp termination for application of coatings.
      3. Fill voids at joints and perimeters with compatible materials and seal with silicone sealant to provide flush, watertight condition at joint.
      4. Prime all surfaces.
      5. After surface preparation, install base coat of silicone – approximately 25 mils.
      6. Embed appropriate width flexible mat reinforcing mesh.
      7. Encapsulate top of mesh with silicone.
      8. Cover entire detail with same thickness silicone coating as the remainder of the roof.

d. At parapet/curb locations with terra-cotta cap, prepare existing terra-cotta coping/curb surfaces and joints as described above and install self-sealing tape over entire terra-cotta substrate prior to recoating.

5. All waste created in the removal process shall be contained, gathered, and properly discarded.

D. Cover and mask adjoining surfaces not receiving coated foamed roofing to provide a neat, strait termination. 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.

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

E. At existing roof drains, thoroughly clean drain bowl and piping to remove build-up of materials restricting flow. Before beginning construction, verify roof drains and piping are clear and in working order. Report any obstructions to Architect and Owner's Representative prior to beginning work. Seal roof coating to prepared and cleaned roof drain.

1. At existing roof drains with plastic or missing strainer, remove existing plastic strainer and provide adjustable drain guard.
2. At existing roof drains with cast-iron strainer, remove, protect, clean and reinstall existing cast-iron strainer after completion of work.

F. Remove dust and dirt from joints and cracks before applying reinforcing and silicone coatings.

G. Prime all substrates as recommended in writing by coated foamed roofing manufacturer.

H. Fill, cover, or tape joints, cracks, expansion joints and base of wall flashings in substrate with flexible mat reinforcing mesh embedded in base and top courses of silicone prior to recoating.

I. Prepare existing terra-cotta coping/curb surfaces and install self-sealing tape over entire prepared terra-cotta substrate prior to recoating.

3.3 SUBSTRATE BOARD INSTALLATION (AT STEEL DECK)

A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches in adjacent rows.

1. At steel roof decks, install substrate board at right angle to flutes of deck.

a. Locate end joints over crests of steel roof deck.

2. Tightly butt substrate boards together.

3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.

4. Mechanically Attached Substrate Boards: Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions and in compliance with “Performance Requirements” Article; minimum quantity: one fastener per 2 square feet at field and perimeter, one fastener per square foot at corners.

    a. Steel Deck: Size fasteners to extend no further than elevation of bottom flute.

3.4 POLYURETHANE FOAM APPLICATION

A. General: Mix and apply polyurethane foam according to ASTM D5469/D5469M and coated foamed roofing manufacturer's written instructions.

1. Fill irregularities and depressions to prevent ponding water.

2. Apply the required full thickness of polyurethane foam in any specific area on same day.

3. Apply only the area of polyurethane foam that can be covered with required base coating on same day or within 24 hours.

4. Apply polyurethane foam to avoid overspray beyond immediate area of work.

    a. All objects that require protection from overspray shall be protected; all movable objects shall be moved to an acceptable area. All intake air vents shall be turned off and covered.

    b. Apply the polyurethane foam in accordance with the polyurethane foam manufacturer's specifications and application instructions.

B. Apply polyurethane foam in lift thicknesses of not less than 1/2 inch and not more than 1-1/2 inches.

C. Uniformly apply total thickness of polyurethane foam indicated, but not less than 1 inch, to a surface tolerance of plus 1/4 inch and no minus.

1. Slope to Drain: Vary thickness uniformly and fill low spots to achieve minimum 1/4-inch-per-foot slope to drain unless otherwise indicated.

D. Apply polyurethane foam to roof penetrations, terminations, and vertical surfaces as indicated. Unless otherwise indicated, extend polyurethane foam at least 4 inches above elevation of adjacent roof field.

1. Do not block existing masonry weeps.

E. Surface Finish: Provide finished surface of polyurethane foam within the following range of surface textures as defined by ASTM D5469/D5469M:

1. Texture: Smooth to orange peel.

F. Remove and replace polyurethane foam not complying with surface-texture limitations. Remove defective thickness and prepare and reapply polyurethane foam with acceptable, uniform results.

3.5 COATING APPLICATION

A. 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.

1. Prior to the application of coating, inspect the polyurethane foam surface to ensure the conditions of Section 3.3 have been met.

B. Apply coating system to polyurethane foam by spray, roller, or other suitable application method according to coating manufacturer's written instructions.

C. 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.

1. Apply topcoat(s) after removing dust, dirt, water, and other contaminants from base coat.
2. Silicone Coating: Apply coating system to a minimum dry film thickness of 25 mils at all areas of removal and replacement and areas of recoating.

D. 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.

E. Mineral Granules: Apply mineral granules over wet topcoat or additional coat, using pressure equipment at the rate of 30 to 40 lbs per 100 sq. ft. Remove excess granules after topcoat has cured.

F. Sealant: Apply sealant to perimeter and other terminations where indicated on Drawings or required by coated foamed roofing manufacturer.

1. At all roof edges, cut 1” ‘V’ groove at SPF termination against metal fascia and fill with continuous silicone sealant – typical. Apply roof edge sealant prior to coating application.

G. Walkways: Install roof walkways in pattern and locations indicated and as follows:

1. Granule-Coated Walkways: Walkways shall be a minimum of 30” wide. Mask off completed coating adjacent to walkways, and apply coat(s) of ‘Safety Yellow’ walkway coating to achieve a minimum dry film thickness of not less than 25 mils or as recommended in writing by coated foamed roofing manufacturer. Spread ‘Safety Yellow’ 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.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Upon completion of roof restoration and recoating, engage a qualified testing agency to perform tests and inspections.

1. Testing agency will identify, seal, and certify samples of materials taken from Project site, with Contractor present.

2. Testing agency will perform tests for product characteristics specified or cited in manufacturer's product data.

    a. Two core samples will be required for roof areas of up to 10,000 sq. ft., and one core sample will be required for each additional 10,000 sq. ft. or part thereof.

    b. Six slit-test samples will be required for each 10,000 sq. ft. of roof area to determine, as a minimum, the number of coats applied and dry film thickness of coating.

3. Testing agency will verify that surfaces slope to drain.

4. Testing agency will perform an infrared moisture scan at all restored roof areas to confirm no wet materials exist beneath the roof membrane. Any wet materials identified are required to be removed and replaced with new materials.

B. Coated foamed roofing will be considered defective if it does not pass tests and inspections.

C. Refill cores, correct slits, and re-coat test areas.

D. Prepare test and inspection reports to be submitted to Architect.

3.7 CORRECTION AND RE-COATING

A. Correct deficiencies in, or remove, foam or coatings that do not comply with requirements; fill and correct substrates and reapply materials.

B. Correct and re-coat coated foamed roofing according to ASTM D6705/D6705M and manufacturer's written instructions.

3.8 CURING, PROTECTING, AND CLEANING

A. 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.

B. Ensure roof surface is free of traffic for minimum of 12 hours after silicone coating application or until coating is completely cured.

C. Protect coated foamed roofing from damage and wear during remainder of construction period.

D. Ensure any subsequent work does not cause damage to finished roof system. If necessary, install protection over finished roof area.

E. Remove excess loose granules after topcoat has cured to avoid migration of granules into storm drains.

F. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 57 50

Attachment: Roof scan