SECTION 075552.16 - STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS PROTECTED MEMBRANE ROOFING

Revise this Section by deleting and inserting text to meet Project-specific requirements.

MasterSpec includes provisions for LEED 2009, LEED v4, IgCC, and Green Globes. Sustainable design requirements may be inserted in the Section Text using the hypertext links.

1. GENERAL
	* + 1. SUMMARY
				1. Section Includes:

Styrene-butadiene-styrene (SBS)-modified bituminous protected membrane roof system.

Base sheet materials.

Interply sheets.

Styrene-butadiene-styrene (SBS)-modified bituminous cap sheet.

Base flashing sheet materials.

Asphalt materials.

Accessory roofing materials.

Roof insulation.

Insulation accessories.

Electronic leak detection (ELD) materials.

Coating materials.

Ballast.

Refer to sections listed below for cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections. Sections listed below are for spec editor’s and design team coordination and are to remain as Editor’s Notes. Remove referenced specification sections within the body of the specification if not applicable to the project.

Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking.

Section 072100 "Thermal Insulation" for insulation beneath the roof deck.

Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.

Section 077100 "Roof Specialties" for [premanufactured metal copings] [fasciae] [gravel stops] [reglets] [roof edge flashings] [and] [counterflashings].

Section 077129 "Manufactured Roof Expansion Joints" for premanufactured roof expansion-joint assemblies.

Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

Section 221423 "Storm Drainage Piping Specialties" for roof drains.

* + - 1. DEFINITIONS
				1. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.
			2. PREINSTALLATION MEETINGS

Retain "Preliminary Roofing Conference" paragraph below if Work of this Section is extensive or complex to justify a conference. A preliminary roofing conference precedes a preinstallation conference and focuses on roof deck construction and planning activities of roofing Installer.

* + - * 1. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

Retain subparagraphs below if required. If retaining, revise to include Project-specific requirements. Insert additional requirements to suit Project.

Meet with Director’s Representative,**[ Construction Manager,]** Director’s Representative's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

Review methods and procedures related to roofing installation, including manufacturer's written instructions.

Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review deck substrate requirements for conditions and finishes.

Review structural loading limitations of roof deck during and after roofing.

Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.

Review governing regulations and requirements for insurance and certificates if applicable.

Review temporary protection requirements for roofing system during and after installation.

Review roof observation and repair procedures after roofing installation.

Retain "Preinstallation Roofing Conference" paragraph below if Work of this Section is extensive or complex enough to justify a preinstallation conference. Paragraph is recommended with or without "Preliminary Roofing Conference" paragraph above.

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

Retain subparagraphs below if required. If retaining, revise to include Project-specific requirements. Insert additional requirements to suit Project.

Meet with Director’s Representative,**[ Construction Manager,]** Director’s insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.

Review methods and procedures related to roofing installation, including manufacturer's written instructions.

Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Examine deck substrate conditions and finishes for compliance with requirements, including flatness.

Review structural loading limitations of roof deck during and after roofing.

Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.

Review governing regulations and requirements for insurance and certificates if applicable.

Review temporary protection requirements for roofing system during and after installation.

Review roof observation and repair procedures after roofing installation.

* + - 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. Product Data: For each type of product.

First option in subparagraph below applies only to concrete, lightweight insulating concrete, and steel roof decks. Second option applies to concrete, lightweight insulating concrete, cementitious wood fiber, steel, and wood roof decks. See the Evaluations.

For insulation, include copy of **[FM Approvals' RoofNav] [SPRI's Directory of Roof Assemblies]** listing.

Include manufacturer’s installation instructions.

* + - * 1. Sustainable Design Submittals:
				2. Shop Drawings: Include plans, sections, details, and attachments to other work, including the following:

Layout and thickness of insulation.

Base flashings and membrane terminations.

Flashing details at penetrations.

Retain subparagraph below if applicable.

Tie-in with adjoining air barrier.

* + - * 1. Samples for Verification: For the following products:

Ballast in gradation**[ and color]** indicated.

Roof paver**[, full sized,]** in each color and texture required.

* + - * 1. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.
				2. Quality Control Submittals:

Coordinate "Qualification Data" paragraph below and as may be supplemented in "Quality Assurance" Article.

Qualification Data: For **[Installer] [manufacturer] [and] [testing agency]**.

Manufacturer Certificates:

Retain "Performance Requirement Certificates" subparagraph below if retaining "FM Approvals' RoofNav Listing," "SPRI's Directory of Roof Assemblies Listing," or "Energy Performance" paragraph in "Performance Requirements" Article.

Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

Submit evidence of compliance with performance requirements.

Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

Evaluation Reports: For components of roofing system, 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.

Retain "Field Test Reports" paragraph below when applicable.

Field Test Reports:

Concrete internal relative humidity test reports.

Field quality-control reports.

Sample Warranties: For manufacturer's special warranties.

* + - * 1. Contract Closeout Submittals

Maintenance Data: For roofing system to include in maintenance manuals.

Retain paragraph below for projects that include existing buildings with warranted roof systems interfacing with the Work of this Section.

Certified statement from existing roof membrane manufacturer, stating that existing roof warranty has not been affected by Work performed under this Section.

* + - 1. QUALITY ASSURANCE
				1. Qualifications:

Second option in "Manufacturers" subparagraph below applies only to concrete, lightweight insulating concrete, and steel roof decks. Third option applies to concrete, lightweight insulating concrete, cementitious wood fiber, steel, and wood roof decks. See the Evaluations.

Manufacturers: A qualified manufacturer that is **[UL listed] [listed in FM Approvals' RoofNav] [listed in SPRI's Directory of Roof Assemblies]** for roofing system identical to that used for this Project.

Installers: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

Retain first subparagraph below if project includes torch-applied roofing components.

Installer to employ on Project installers and supervisors certified through the NRCA/MRCA Certified Roofing Torch Applicator (CERTA) program.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
				2. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer.

Protect stored liquid material from direct sunlight.

Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

* + - * 1. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources.

Store in a dry location.

Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

* + - * 1. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.
			1. FIELD CONDITIONS
				1. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
			2. WARRANTY

When warranties are required, verify with Director’s Representative that warranties stated in this article are not less than remedies available to the Facility under prevailing local laws.

Retain "Special Warranty" paragraph below if manufacturer's labor-and-materials warranty, covering roofing system, is required. Verify coverage offered by manufacturers, because roof insulation and other roofing components may be excluded unless part of a roof membrane manufacturer's roofing system warranty. If inserting special provisions, retitle paragraph "Special Roofing Manufacturer's Warranty." Verify warranty availability, and coordinate selection of manufacturers accordingly.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

Retain options in first subparagraph below based on those used on Project. Verify availability of manufacturer's total-system warranty and components included.

Special warranty includes roof membrane, base flashings, **[roof insulation,] [vapor retarder,] [roof pavers,]** and other components of roofing system.

Verify available roofing system warranties and warranty periods with manufacturers.

Warranty Period: **[10] [15] [20] <Insert number>** years from date of Substantial Completion.

If retaining "Special Project Warranty" paragraph below, use or revise sample roofing Installer's warranty form at end of this Section. Alternatively, insert reference to local roofing contractor association's warranty form, or use another form as advised by Director’s Representative. Revise paragraph to reflect scope of special Project warranty.

* + - * 1. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system, such as roof membrane, base flashing, **[roof insulation,] [vapor retarders,] [and] [roof pavers,]** for the following warranty period:

Verify available warranties and warranty periods.

Warranty Period: **[Two] <Insert number>** years from date of Substantial Completion.

1. PRODUCTS

Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements.

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers.

* + - 1. PERFORMANCE REQUIREMENTS
				1. General Performance: Installed roofing system and flashings to withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings to remain watertight.

Requirements in "Accelerated Weathering" and "Impact Resistance" subparagraphs below are required by the BCNYS for all roof coverings installed on roofs with slopes of less than 2:12.

Accelerated Weathering: Roof membrane to withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

Impact Resistance: Roof membrane to resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

* + - * 1. Material Compatibility: Roofing materials to be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

Always retain "Wind Uplift Resistance" paragraph below. See the Evaluations and Roof Wind Designer online software program, or consult structural engineer for determination of wind uplift pressures.

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

Indicate dimensions of perimeter and corners in subparagraphs below for simple roof shapes or indicate on Drawings.

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 each building corner.

Retain "FM Approvals' RoofNav Listing" or "SPRI's Directory of Roof Assemblies Listing" paragraph below, if applicable.

Retain "FM Approvals' RoofNav Listing" paragraph below if Project is FM Global insured or if FM Global requirements set a minimum quality standard. Coordinate requirements in FM Approvals classification with other requirements in this Section. For further clarification, consult FM Approvals.

* + - * 1. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

Retain one option in "Fire/Windstorm Classification" subparagraph below based on windstorm classification of Project. Verify availability of roofing systems that comply with these classifications. "Class 1A" signifies compliance with ASTM E108, Class A fire performance for FM Approvals Class 1 roof covers.

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

Retain one option in "Hail-Resistance Rating" subparagraph below based on geographical location of Project or desired rating. Verify availability of roofing systems, including specified components, that comply with these ratings using FM Approvals' RoofNav.

Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 **[MH] [SH] [VSH]**.

Retain "SPRI's Directory of Roof Assemblies Listing" paragraph below if SPRI Directory of Roof Assemblies requirements will set a minimum quality standard. Coordinate requirements in "Wind Uplift Load Capacity" subparagraph with other requirements in this Section. Loosely laid and ballasted roofing systems are not included in SPRI's Directory of Roof Assemblies.

* + - * 1. SPRI's Directory of Roof Assemblies Listing: Roof membrane, base flashings, and component materials comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and are listed in SPRI's Directory of Roof Assemblies for roof assembly identical for that specified for this Project.

Retain one option in "Wind Uplift Load Capacity" subparagraph below based on windstorm rating of Project. Verify availability of roofing systems that comply with these ratings.

Wind Uplift Load Capacity: **[60 psf] [75 psf] [90 psf] [105 psf] [120 psf] <Insert capacity>**.

Retain "ENERGY STAR Listing" paragraph below for roof pavers that must comply with ENERGY STAR requirements. The DOE's ENERGY STAR "Roof Products Qualified Product List" is available in PDF at www.energystar.gov/productfinder/product/certified-roof-products/results.

* + - * 1. ENERGY STAR Listing: Roof pavers to be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for roof paver products.

Usually, retain "Energy Performance" paragraph below for roof pavers that must comply with "California Code of Regulations, Title 24." Options are values required for low-slope roofs by prescriptive approach; revise if other values are required for building-envelope trade-off approach or whole-building performance approach. A list of products tested in accordance with ANSI/CRRC S100, with their test values, is available at www.coolroofs.org.

* + - * 1. Energy Performance: Roof pavers to have an initial solar reflectance of not less than **[0.70] <Insert value>** and an emissivity of not less than **[0.75] <Insert value>** when tested in accordance with ANSI/CRRC S100.

Retain one of three options in "Exterior Fire-Test Exposure" paragraph below based on fire classification of roof assembly and roof covering. Delete paragraph if including exterior fire-test exposure in FM Approvals class designation.

* + - * 1. Exterior Fire-Test Exposure: ASTM E108 or UL 790, **[Class A] [Class B] [Class C]**; for application and roof slopes indicated; testing by a qualified testing agency.

Identify products with appropriate markings of applicable testing agency.

Retain "Fire-Resistance Ratings" paragraph 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.

* + - * 1. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated.

Identify products with appropriate markings of applicable testing agency.

* + - 1. MANUFACTURERS
				1. Styrene-Butadiene-Styrene (SBS)-Modified Bituminous Protected Membrane Roof System: See the following articles for individual roof materials required.
			2. SOURCE LIMITATIONS

Retain this article to limit sources for the entire Section if required to comply with FM Approvals, UL, or special warranty provisions; confirm warranty requirements with manufacturer.

* + - * 1. Obtain components, including roof insulation **<Insert products>** for roofing system from **[same manufacturer as membrane roofing] [or] [manufacturer approved by membrane roofing manufacturer]**.
			1. BASE SHEET MATERIALS

Retain one of 13 base sheet paragraphs below if required. Verify with roof membrane manufacturers that specified products, and their respective installation method, are recommended and warranted by roof membrane manufacturer when used in a protected membrane roof system. Self-adhering base sheets may be offered; verify with manufacturer.

* + - * 1. SBS-Modified Bitumen Type I, Polyester-Mat Base Sheet: ASTM D6164, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric; smooth surfaced; suitable for cold adhesive or hot asphalt application method.
				2. SBS-Modified Bitumen Type I, Polyester-Mat Base Sheet, Torch: ASTM D6164, Type I, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric; smooth surfaced; suitable for torch application method.
				3. SBS-Modified Bitumen Type II, Polyester-Mat Base Sheet: ASTM D6164, Type II, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric; smooth surfaced; suitable for cold adhesive or hot asphalt application method.
				4. SBS-Modified Bitumen Type II, Polyester-Mat Base Sheet, Torch: ASTM D6164, Type II, Grade S, SBS-modified asphalt sheet, reinforced with polyester fabric; smooth surfaced; suitable for torch application method.
				5. SBS-Modified Bitumen Type I, Glass-Fiber-Mat Base Sheet: ASTM D6163, Type I, Grade S, SBS-modified asphalt sheet, reinforced with glass fibers fabric; smooth surfaced; suitable for cold adhesive or hot asphalt application method.
				6. SBS-Modified Bitumen Type I, Glass-Fiber-Mat Base Sheet, Torch: ASTM D6163, Type I, Grade S, SBS-modified asphalt sheet, reinforced with glass fibers; smooth surfaced; suitable for torch application method.
				7. SBS-Modified Bitumen Type II, Glass-Fiber-Mat Base Sheet: ASTM D6163, Type II, Grade S, SBS-modified asphalt sheet, reinforced with glass fibers; smooth surfaced; suitable for cold adhesive or hot asphalt application method.
				8. SBS-Modified Bitumen Type II, Glass-Fiber-Mat Base Sheet, Torch: ASTM D6163, Type II, Grade S, SBS-modified asphalt sheet, reinforced with glass fibers, smooth surfaced, suitable for torch application method.
				9. SBS-Modified Bitumen Type I, Polyester- and Glass-Fiber-Mat Base Sheet: ASTM D6162, Type I, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; smooth surfaced; suitable for cold adhesive or hot asphalt application method.
				10. SBS-Modified Bitumen Type I, Polyester- and Glass-Fiber-Mat Base Sheet, Torch: ASTM D6162, Type I, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers, smooth surfaced, suitable for torch application method.
				11. SBS-Modified Bitumen Type III, Polyester- and Glass-Fiber-Mat Base Sheet: ASTM D6162, Type III, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers, smooth surfaced, suitable for cold adhesive or hot asphalt application method.
				12. SBS-Modified Bitumen Type III, Polyester- and Glass-Fiber-Mat Base Sheet, Torch: ASTM D6162, Type III, Grade S, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; smooth surfaced; suitable for torch application method.

Retain "Asphalt-Coated, Glass-Fiber-Mat, Venting Base Sheet" paragraph below for coated glass-fiber venting base sheet. Venting base sheets may be required over concrete roof decks or over existing roofing before reroofing. Review other options with roofing system manufacturer, and revise description to suit Project.

* + - * 1. Asphalt-Coated, Glass-Fiber-Mat, Venting Base Sheet: ASTM D4897, Type II, venting, nonperforated, asphalt-impregnated and -coated, glass-fiber base sheet with mineral granule surfacing on bottom surface.
			1. INTERPLY SHEETS

Retain "Glass-Fiber Interply Sheet" paragraph below for hybrid roofing systems that combine built-up roofing ply sheets with a polymer-modified bituminous membrane cap sheet.

* + - * 1. Glass-Fiber Interply Sheet: ASTM D2178, **[Type IV] [Type VI]**, asphalt-impregnated, glass-fiber felt.
			1. STYRENE-BUTADIENE-STYRENE- (SBS-) MODIFIED BITUMINOUS CAP SHEET

Retain one of 10 cap sheet paragraphs below if applicable.

* + - * 1. SBS-Modified Bitumen Type I, Polyester-Mat, Granule-Surfaced Cap Sheet: ASTM D6164, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric; suitable for cold adhesive or hot asphalt application method.

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

* + - * 1. SBS-Modified Bitumen Type I, Polyester-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6164, Type I, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric; suitable for torch application method.

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

* + - * 1. SBS-Modified Bitumen Type II, Polyester-Mat, Granule-Surfaced Cap Sheet: ASTM D6164, Type II, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric; suitable for cold adhesive or hot asphalt application method.

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

* + - * 1. SBS-Modified Bitumen Type II, Polyester-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6164, Type II, Grade G, SBS-modified asphalt sheet, reinforced with polyester fabric; suitable for torch application method.

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

* + - * 1. SBS-Modified Bitumen Type I, Glass-Fiber-Mat, Granule-Surfaced Cap Sheet: ASTM D6163, Type I, Grade G, SBS-modified asphalt sheet, reinforced with glass fibers; suitable for cold adhesive or hot asphalt application method.

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

* + - * 1. SBS-Modified Bitumen Type I, Glass-Fiber-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6163, Type I, Grade G, SBS-modified asphalt sheet, reinforced with glass fibers; suitable for torch application method.

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

* + - * 1. SBS-Modified Bitumen Type I, Polyester- and Glass-Fiber-Mat, Granule-Surfaced Cap Sheet: ASTM D6162, Type I, Grade G, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; suitable for cold adhesive or hot asphalt application method.

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

* + - * 1. SBS-Modified Bitumen Type I, Polyester- and Glass-Fiber-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6162, Type I, Grade G, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; suitable for torch application method.

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

* + - * 1. SBS-Modified Bitumen Type III, Polyester- and Glass-Fiber-Mat, Granule-Surfaced Cap Sheet: ASTM D6162, Type III, Grade G, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; suitable for cold adhesive or hot asphalt application method.

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

* + - * 1. SBS-Modified Bitumen Type III, Polyester- and Glass-Fiber-Mat, Granule-Surfaced Cap Sheet, Torch: ASTM D6162, Type III, Grade G, SBS-modified asphalt sheet, reinforced with a combination of polyester fabric and glass fibers; suitable for torch application method.

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

* + - 1. BASE FLASHING SHEET MATERIALS

Retain one of first three paragraphs below if backer sheet is required behind exposed flashing sheet. Self-adhering backer sheets may be offered; verify with manufacturer. Coordinate selection with warranty duration and substrates. See the Evaluations.

* + - * 1. Asphalt-Coated, Glass-Fiber-Mat Backer Sheet: ASTM D4601, **[Type I] [Type II]**, asphalt-impregnated and -coated, glass-fiber sheet, dusted with fine mineral surfacing on both sides.
				2. Asphalt-Coated, Organic-Felt Backer Sheet: ASTM D2626, asphalt-saturated and -coated organic felt, dusted with fine mineral surfacing on both sides.
				3. SBS-Modified Bitumen Backer Sheet: **[ASTM D6164, Type I or II, Grade S, reinforced with polyester fabric] [ASTM D6163, Type I or II, Grade S, reinforced with glass fibers] [ASTM D6162, Type I or II, Grade S, reinforced with a combination of polyester fabric and glass fibers]**; smooth surfaced; suitable for application method specified.
				4. SBS-Modified Bitumen, Granule-Surfaced Flashing Sheet: **[ASTM D6164, Type I or II, Grade G, reinforced with polyester fabric] [ASTM D6163, Type I or II, Grade G, reinforced with glass fibers] [ASTM D6162, Type I or II, Grade G, reinforced with a combination of polyester fabric and glass fibers]**; granule surfaced; suitable for application method specified, and as follows:

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

Metal-surfaced flashing sheet is produced by several manufacturers for torch application and, in some cases, for hot-mopped application with SBS-modified roofing.

* + - * 1. SBS-Modified Bitumen, Metal-Surfaced Flashing Sheet: ASTM D6298, metal-foil-surfaced SBS-modified asphalt sheet, reinforced with glass fibers, suitable for application method specified, and as follows:

Retain one of four options in "Metal Surfacing" subparagraph below.

Metal Surfacing: **[Aluminum] [Copper] [Stainless steel] [Aluminum, fluoropolymer-coated finish, of color and gloss selected by Director’s Representative from manufacturer's full range]**.

Retain "Glass-Fiber Fabric" paragraph below if glass-fiber fabric is required at upper flashing terminations.

* + - * 1. Glass-Fiber Fabric: Woven glass-fiber cloth, treated with asphalt, complying with ASTM D1668, Type I.
				2. Liquid Flashing System: Roof membrane manufacturer's standard one- or two-part moisture curing resin with low solvent content, consisting of a primer, flashing cement, and scrim.
			1. ASPHALT MATERIALS

Retain "Asphalt Primer" paragraph below if priming concrete roof deck.

* + - * 1. Asphalt Primer: ASTM D41.

Retain "Roofing Asphalt" or "SEBS-Modified Roofing Asphalt" paragraph below for roofing asphalt used with base sheets or glass-fiber base-ply sheets, and possibly with roofing membrane and base flashing. See roofing manufacturer's written instructions for requirements. Although "steep" asphalt (Type III) is used, "extra steep" asphalt (Type IV) predominates. SEBS-modified roofing asphalt is offered by some roofing system manufacturers and has a higher softening temperature and better low-temperature flexibility than standard roofing asphalt.

* + - * 1. Roofing Asphalt: ASTM D312, **[Type III] [Type IV] [Type III or IV as recommended by roofing system manufacturer for application]**.
				2. SEBS-Modified Roofing Asphalt: ASTM D6152.
			1. ACCESSORY ROOFING MATERIALS
				1. General: Accessory materials recommended by roofing manufacturer for intended use and compatible with other roofing components.

Retain "Adhesive and Sealants" subparagraph below for projects located in jurisdictions where VOC limits are established by statute.

Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

* + - * 1. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
				2. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

Retain "Cold-Applied Trichloroethylene Asphalt Adhesive" or "Cold-Applied Polymer-Modified Asphalt Adhesive" paragraph below if adhering below-membrane roof insulation, base sheets, cap sheets, or base flashing using cold-applied adhesives. Verify with roof membrane manufacturer that cold-applied adhesive application is acceptable for protected roof membrane applications, as not all manufacturers permit the use of cold-applied adhesive for adhering roof membranes. Cold-applied adhesives are typically solvent based.

* + - * 1. Cold-Applied Trichloroethylene Asphalt Adhesive: ASTM D3019, Type III, roof membrane manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive, specially formulated for compatibility and use with **[roofing membrane] [and] [base flashings]**.
				2. Cold-Applied Polymer-Modified Asphalt Adhesive: Roof membrane manufacturer's standard solvent-and asbestos-free, cold-applied adhesive, specially formulated for compatibility and use with roofing components.

Retain "Asphalt Roofing Cement" paragraph below if asphalt roofing cement is used to adhere flashings or integral metal sheet flashings and is acceptable to roofing system manufacturer.

* + - * 1. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required by roofing system manufacturer for application.

Retain "Mastic Sealant" paragraph below if sealant is needed for moving joints in sheet metal accessories or for certain locations where asphalt roofing cement may be inadequate or undesirable.

* + - * 1. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

Delete "Insulation Cant Strips" paragraph below if using wood cants specified in Section 061000 "Rough Carpentry."

* + - * 1. Insulation Cant Strips: **[ASTM C728, perlite insulation board] [ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board]**.
				2. Metal Flashing Sheet: As specified in Section 076200 "Sheet Metal Flashing and Trim."

Retain "Separator Sheet" Paragraph below if separator sheet is required over roof membrane.

* + - * 1. Separator Sheet: Polyethylene sheet, 4 mils thick, minimum.
				2. Miscellaneous Accessories: Provide accessories recommended by roofing system manufacturer.
			1. ROOF INSULATION

Coordinate insulation selection and thicknesses with adjoining construction as well as HVAC design and energy program.

Roofing system manufacturers may require use of their own insulations or limit approvals to specific insulation manufacturers. Coordinate available insulation options with selected manufactures Retain second option in "General" paragraph below if FM Approvals' approval is required or if FM Global requirements are specified as a performance standard.

* + - * 1. General: Preformed roof insulation boards manufactured**[ or approved]** by roof membrane manufacturer, **[ approved for use in FM Approvals' RoofNav listed roofing assemblies] [, approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies]**.
				2. Extruded-Polystyrene Board Insulation, Type VI: ASTM C578, 1.8 lb/cu. ft. minimum density, 40 psi minimum compressive strength, with drainage channels on bottom side, and with two or four edges rabbeted.

Thermal Resistance: R-value of 5.0 per 1 inch.

Size: **[24 by 96 inches] [48 by 96 inches]**.

Thickness:

Base Layer: [**1-1/2 inch**] [**2 inches**] [**3 inches**].

Retain "Upper Layer" subparagraph below if additional insulation is required to obtain desired roof/ceiling R-value.

Upper Layer: **<Insert thickness>**.

* + - * 1. Extruded-Polystyrene Board Insulation, Type VII: ASTM C578, 2.2 lb/cu. ft minimum density, 60 psi minimum compressive strength, with drainage channels on bottom side, and with two or four edges rabbeted.

Thermal Resistance: R-value of 5.0 per 1 inch.

Size: 24 by 96 inches.

Thickness:

Base Layer: **[**1-1/2 inches**] [**2 inches**] [**3 inches**]**.

Retain "Upper Layer" subparagraph below if additional insulation is required to obtain desired roof/ceiling R-value.

Upper Layer: **<Insert thickness>**.

First option in "Mortar-Faced, Extruded-Polystyrene Board Insulation" paragraph below describes T. Clear Corporation's "Lightguard," and second describes T. Clear Corporation "Heavyguard."

* + - * 1. Mortar-Faced, Extruded-Polystyrene Board Insulation: ASTM C578, Type VI, 1.8-lb/cu. ft. minimum density, with tongue-and-groove edges on long dimension, and latex-modified cement mortar topping, **[3/8 inch thick, 4.5 lb/sq. ft.] [15/16 inch thick, 11 lb/sq. ft.]**.

Insulation Thermal Resistance: R-value of 5.0 per 1 inch.

Size: 24 by 48 inches.

Insulation Thickness: **[2 inches] [3 inches**.

* + - 1. INSULATION ACCESSORIES
				1. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with other roofing system components.

Protection mats in "Protection Mat" paragraph below, sometimes called "filter fabrics" or "fabric mats," limit aggregate ballast movement and control insulation flotation in protected membrane roofing systems.

* + - * 1. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

Retain "Metal Securement System" paragraph below if T. Clear's proprietary metal securement system is required for mortar-faced board insulation. Specify gravel stop or counterflashing in Section 076200 "Sheet Metal Flashing and Trim" or Section 077100 "Roof Specialties" if required.

* + - * 1. Metal Securement System: Perimeter securement flashing and strapping fabricated from 3-inch- wide stainless steel, a minimum of 0.031 inch thick. Provide fasteners as recommended by mortar-faced insulation manufacturer.
			1. ELECTRONIC LEAK DETECTION (ELD) MATERIALS

Retain this article if required for ELD testing. Certain roof assembly components including dry insulation and cover boards require a conductive medium installed immediately below the roof membrane. Confirm selected materials will not void roofing warranty. See the Evaluations.

* + - * 1. Conductive Medium: Materials providing less than 104 ohms per square as determined in accordance with ASTM D4496 and approved by roof membrane manufacturer.

Electrically Conductive Primer: Water-based, non-flammable, nonmetallic, low-VOC primer**[, UL listed and FM Global approved]**.

Grounding Screen: **[Welded, stainless steel mesh] [Aluminum screen]**, for use with vector mapping system**[, FM Global approved]**.

Electrically Conductive Fabric: Non-abrasive felt.

* + - * 1. Leak Detection and Moisture-Monitoring System: Permanent, embedded leak detection and moisture-monitoring system.

Sensors measuring moisture content**[, temperature, and vapor drive]**, placed **[below roof insulation] [over vapor barrier]** and connected to a monitoring program, with a notification indicating location of breach.

Sensors measuring moisture content**[, temperature, and vapor drive]**, in a conductive fabric placed below roof membrane and connected to a monitoring program, with a notification indicating location of breach.

* + - 1. COATING MATERIALS

Retain this article if roof coatings are required over smooth-surfaced, SBS-modified bituminous roofing or base flashing. Coatings protect against UV exposure and degradation and may be required to achieve fire rating or "cool-roof" rating. Recoating may be required at five- to seven-year intervals, depending on severity of exposure.

* + - * 1. Roof Coating:

Asphalt-emulsion coatings in first two subparagraphs below may be finish coatings or may be a base coat for an aluminum-pigmented finish coating. ASTM D1227 applies to asphalt emulsions for use as protective coatings over roofing with minimum roof slope of 1/2 inch per 12 inches (1:24). Revise description to SBS- or SEBS-modified asphalt emulsions if required.

ASTM D1227, Type II, **[Class 1, mineral-colloid-emulsified, fibered] [Class 2, chemically emulsified, filled or fibered]** asphalt emulsion, asbestos free.

ASTM D1227, Type III, **[Class 1, mineral-colloid-emulsified] [Class 2, chemically emulsified]** asphalt emulsion, nonfibered.

Retain one of two subparagraphs below to add reflective surface coating. White acrylic-emulsion roof coatings typically have much higher solar reflectance and infrared emittance than aluminum-pigmented coatings.

ASTM D2824, **[Type I, nonfibered] [Type III, fibered, asbestos-free]**, aluminum-pigmented asphaltic coating.

ASTM D6083, acrylic elastomer emulsion coating, formulated for use on bituminous roof surfaces.

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

* + - 1. BALLAST

Retain "Aggregate Ballast" paragraph below for aggregate-ballasted installations. If smooth-faced aggregate is preferred, verify availability and cost. Insert requirements for color if required.

* + - * 1. Aggregate Ballast: **[Smooth, washed riverbed gravel or other acceptable smooth-faced stone] [Crushed, washed gravel or crushed stone]** that withstands weather exposure without significant deterioration and does not contribute to membrane degradation; of the following size:

Retain one or more of three options in "Size" subparagraph below to suit Project. Coordinate size of aggregate with optional paragraphs for ballast weight in Part 3.

Size: ASTM D448, **[Size 2, ranging in size from 1-1/2 to 2-1/2 inches] [Size 4, ranging in size from 3/4 to 1-1/2 inches] [Size 5, ranging in size from 1/2 to 1 inch]**.

Retain "Lightweight Roof Pavers" paragraph below if covering entire roofed area with interlocking, lightweight roof pavers. Verify uplift wind resistance with interlocking roof paver manufacturers.

* + - * 1. Lightweight Roof Pavers: Interlocking, lightweight concrete units; grooved back, with four-way drainage capability; beveled, doweled, or otherwise profiled; and as follows:

Coordinate size selection in "Size" subparagraph below with minimum paver coverage required, especially at corners, perimeter, penetrations, and above large wall openings. Paver sizes vary among manufacturers and include 8 by 16, 12 by 12, 12 by 16-1/2, and 12 by 18 inches.

Size: **<Insert actual size(s) of pavers>**.

Insert weight of roof pavers in "Weight" subparagraph below. SPRI identifies interlocking, lightweight roof pavers as weighing at least 10 lb/sq. ft. but not exceeding 18 lb/sq. ft.. Dow's Tech Solutions 508.2 requires a minimum of 11 lb/sq. ft. and notes that the wind-resistance warranty is the responsibility of interlocking paver manufacturer. Verify availability with manufacturers.

Weight: **<Insert weight or weight range>**.

Retain one of two options in "Compressive Strength" subparagraph below.

Compressive Strength: **[3000 psi] [5000 psi] <Insert value>**, minimum.

Retain one of three options in "Colors and Textures" subparagraph below. If retaining first option, indicate colors and textures in a separate schedule.

Colors and Textures: **[As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Director’s Representative from manufacturer's full range]**.

Retain one of two subparagraphs below for paver supports, which are used to elevate pavers and facilitate ventilation and drainage, if required. Paver supports are required when pavers cover more than 10 percent of the insulation surface. Retain first subparagraph if paver supports are integrally cast. Retain second subparagraph if separate pedestal supports, which are used to space, level, and stabilize pavers, are required. Pedestals may be of fixed or adjustable height for leveling pavers over a sloped substrate.

Integral Paver Supports: Integral corner pedestals, creating a minimum 3/16-inch- high ventilation air space.

Paver Support Assembly: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including **[fixed-height] [adjustable or stackable]** pedestals, shims, and spacer tabs for joint spacing of **[1/8 inch ] [3/16 inch] [1/8 to 3/16 inch]**.

Retain "Heavyweight Roof Pavers" paragraph below if roof pavers are required to form walkways, cover entire roofed area, or replace aggregate ballast at roof perimeters, corners, and penetrations.

* + - * 1. Heavyweight Roof Pavers: Heavyweight, hydraulically pressed concrete units, **[square edged] [with top edges beveled 3/16 inch]**, factory cast for use as roof pavers; absorption not greater than 5 percent according to ASTM C140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance according to ASTM C67; and as follows:

Coordinate size selection in "Size" subparagraph below with minimum paver coverage required, especially at corners, perimeter, penetrations, and above large wall openings. Consider handling of pavers as weight increases. Paver sizes vary among manufacturers and include 8 by 16, 12 by 12, 12 by 16-1/2, and 12 by 18 inches.

Size: **[24 by 24 inches] <Insert dimensions>**; manufactured to dimensional tolerances of plus or minus 1/16 inch in length, height, and thickness.

Retain one of two options, or insert weight of roof pavers in "Weight" subparagraph below. SPRI identifies heavyweight roof pavers as weighing 18 lb/sq. ft. or more. Dow's Tech Solutions 508.2 identifies two roof paver minimum weights of 18 and 22 lb/sq. ft. respectively; see Dow's Tech Solutions 508.2 for details. Roof paver weights vary; 18, 20, 22, and 24 lb/sq. ft., minimum. Verify availability with manufacturers.

Weight: **[18 lb/sq. ft.] [22 lb/sq. ft.] <Insert weight>**.

Retain one of two options in "Compressive Strength" subparagraph below.

Compressive Strength: **[7500 psi] [6500 psi] <Insert value>**, minimum.

Retain one of three options in "Colors and Textures" subparagraph below. If retaining first option, indicate colors and textures in a separate schedule.

Colors and Textures: **[As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Director’s Representative from manufacturer's full range]**.

Retain one of two subparagraphs below for paver supports, which are used to elevate pavers and facilitate ventilation and drainage, if required. Paver supports are required when pavers cover more than 10 percent of the insulation surface. Retain first subparagraph if paver supports are integrally cast. Retain second subparagraph if separate pedestal supports, which are used to space, level, and stabilize pavers, are required. Pedestals may be of fixed or adjustable height for leveling pavers over a sloped substrate.

Integral Paver Supports: Integral corner pedestals, creating a minimum 3/16-inch- high ventilation air space.

Paver Support Assembly: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including **[fixed-height] [adjustable or stackable]** pedestals, shims, and spacer tabs for joint spacing of **[1/8 inch ] [3/16 inch] [1/8 to 3/16 inch]**.

1. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:

Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.

Cants, blocking, curbs, and nailers are required at edges of roof penetrations, area dividers, and terminations.

Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations.

Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.

Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than **[75] <Insert number>** percent, or as recommended by roofing system manufacturer, when tested according to ASTM F2170.

Test Frequency: One test probe per each **[1000 sq. ft.] <Insert area>**, or portion thereof, of roof deck, with not less than three test probes.

Submit test reports within 24 hours of performing tests.

Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

* + - * 1. Proceed with installation only after unsatisfactory conditions have been corrected.
			1. PREPARATION
				1. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation, according to roofing system manufacturer's written instructions.

Remove sharp projections.

* + - * 1. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction.

Remove roof-drain plugs when no work is taking place or when rain is forecast.

Retain paragraph below if priming concrete deck before installing overlying roofing system components in hot roofing asphalt.

* + - * 1. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft. and allow primer to dry.
			1. INSTALLATION OF ROOFING, GENERAL

Retain one of first two paragraphs below.

* + - * 1. Install roofing system according to roofing system manufacturer's written instructions, applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing," **[FM Approvals' RoofNav] [SPRI's Directory of Roof Assemblies]** listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.
				2. Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.

Remove and discard temporary seals before beginning work on adjoining roofing.

Retain first paragraph below if tie-ins to existing roofing are required.

* + - * 1. Install roof membrane and accessory materials to tie in to existing roofing to maintain weathertightness of transition**[ and to not void warranty for existing roofing system]**.

Retain first paragraph below when air barriers are part of the Project. Drawing details should specifically illustrate transition between different air barrier components.

* + - * 1. Coordinate installation and transition of roofing system component serving as an air barrier, with air barrier specified in **[Section 072713 "Modified Bituminous Sheet Air Barriers."] [Section 072715 "Nonbituminous Self-Adhering Sheet Air Barriers."] [Section 072726 "Fluid-Applied Membrane Air Barriers."]**

Retain first paragraph below if applicable.

* + - * 1. Start installation of roofing in presence of manufacturer's technical personnel**[ and Director’s Representative’s testing and inspection agency]**.

Retain first paragraph below if roof slope exceeds minimum permitted by roofing system manufacturer. Revise minimum roof slope to suit application.

* + - * 1. Where roof slope exceeds **[1/2 inch per 12 inches] [3/4 inch per 12 inches] <Insert slope>**, install roofing sheets parallel with slope.
				2. Coordinate installation of roofing system, so components of the roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

Provide tie-offs at end of each day's work to cover exposed roofing sheets with a course of coated felt set in roofing cement**[ or hot roofing asphalt]**, with joints and edges sealed.

Complete terminations and base flashings, and provide temporary seals to prevent water from entering completed sections of roofing system.

Remove and discard temporary seals before beginning work on adjoining roofing.

Retain "Asphalt Heating" or "SEBS-Modified Asphalt Heating" paragraph below if using hot roofing asphalt. Usually delete both paragraphs for sustainable projects. Heating and application requirements may differ among roofing system manufacturers.

* + - * 1. Asphalt Heating:

Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application.

For cap sheets, heat asphalt according to cap sheet manufacturer's recommendations.

Circulate asphalt during heating.

Do not raise roofing asphalt temperature above equiviscous temperature range more than one hour before time of application.

For cap sheets, comply with cap sheet manufacturer's recommendations.

Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating.

Do not heat roofing asphalt within 25 deg F of flash point.

Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.

Apply hot roofing asphalt within plus or minus 25 deg F of equiviscous temperature.

For cap sheets, comply with cap sheet manufacturer's recommendations.

* + - * 1. SEBS-Modified Asphalt Heating: Heat and apply roofing asphalt according to roofing system manufacturer's written instructions.
				2. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.
			1. INSTALLATION OF ELD COMPONENTS

Retain first paragraph below if conductive medium will be field installed immediately below roof membrane.

* + - * 1. Install conductive medium over roof deck**[ and on vertical locations to receive roof membrane]** in accordance with manufacturer's written instructions.

Retain paragraph below for embedded ELD and moisture-monitoring systems.

* + - * 1. Install sensors, **[wire loop] [conductive fabric]**, connections, and accessory items required for complete system in accordance with manufacturer's written instructions.
			1. INSTALLATION OF BASE-SHEET
				1. Before installing, unroll base sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature.

Retain one of three paragraphs below. Coordinate with base-sheet material selected above.

First paragraph below applies to a two-ply SBS-modified bitumen roofing system. Coordinate option selection with product selected above. Revise paragraph if selected roof membrane manufacturer(s) require a two-ply base sheet.

* + - * 1. Installation of **[SBS-Modified Bitumen Polyester-Mat] [SBS-Modified Fiberglass-Mat] [SBS-Modified Bitumen Polyester and Fiberglass-Mat]** Base Sheet:

Install base sheet according to roofing manufacturer's written instructions, starting at low point of roofing system.

Extend roofing sheets over and terminate above cants.

Install base sheet in a shingle fashion.

Retain one of first two subparagraphs below.

Adhere to substrate in a uniform coating of cold-applied adhesive.

Torch-apply to substrate.

Perform torch application according to NFPA 241, including two-hour fire watch after torches have been extinguished.

Install base sheet without wrinkles, tears, or air pockets.

Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.

Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches.

Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches.

Stagger end laps not less than 18 inches.

**[Heat-weld end laps,] [Completely bond and seal laps,]** leaving no voids.

Roll laps with a 20-pound roller.

Repair tears and voids in laps and lapped seams not completely sealed.

Apply pressure to the body of the base sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.

Product listed in "Installation of Asphalt-Coated Glass-Fiber-Mat Base Sheet" paragraph below is for minimal requirements incorporating a two-ply system.

* + - * 1. Installation of Asphalt-Coated Glass-Fiber-Mat Base Sheet:

Install base sheet according to roofing manufacturer's written instructions, starting at low point of roofing system.

Extend roofing sheets over and terminate above cants.

Install base sheet in a shingle fashion.

Adhere to substrate in a **[solid mopping of hot roofing asphalt] [uniform coating of cold-applied adhesive]**

Install base sheet without wrinkles, tears, or air pockets.

Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.

Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches.

Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches .

Stagger end laps not less than 18 inches.

Completely bond and seal laps, leaving no voids.

Repair tears and voids in laps and lapped seams not completely sealed.

* + - * 1. Installation of Vented Base Sheet:

Spot or strip mop to substrate with hot roofing asphalt vented base sheet with vented side down.

Retain first subparagraph below if Project is FM Global insured, or if FM Global or SPRI Directory of Roof Assemblies requirements are proposed as a performance standard. Retain second subparagraph if fastening is based on "Wind Uplift Resistance" paragraph in "Performance Requirements" Article. Coordinate with "Performance Requirements" Article. Fastener numbers will increase at corners and perimeter over number required for field of roof.

Fasten vented base sheet according to requirements in **[FM Approvals' RoofNav for specified Windstorm Resistance Classification] [SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity]**.

Fasten vented base sheet to resist uplift pressure at corners, perimeter, and field of roof.

* + - 1. INSTALLATION OF INTERPLY SHEETS

Interply sheets may be applied directly to nonnailable deck or base sheet. Retain number of ply sheets from options in paragraph below.

* + - * 1. Install **[two] [three]** ply sheets, starting at low point of roofing.

Align ply sheets without stretching.

Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane.

Shingle in direction to shed water.

Extend ply sheets over and terminate above cants.

Embed each ply sheet in a solid mopping of hot roofing asphalt applied at rate required by roofing manufacturer, to form a uniform membrane without ply sheets touching.

* + - 1. INSTALLATION OF SBS-MODIFIED BITUMINOUS CAP SHEET
				1. Before installing, unroll cap sheet, cut into workable lengths, and allow to lie flat for a time period recommended by manufacturer for the ambient temperature at which cap sheet will be installed.
				2. Install modified bituminous roofing cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system.

Extend cap sheet over and terminate above cants.

Install cap sheet in a shingle fashion.

Install cap sheet as follows:

Retain one of first three subparagraphs below.

Adhere to substrate in a solid mopping of hot roofing asphalt applied at asphalt temperature recommended by cap sheet manufacturer.

Adhere to substrate in a uniform coating of cold-applied adhesive.

Torch-apply to substrate.

Perform torch application according to NFPA 241, including two-hour fire watch after torches have been extinguished.

Install cap sheet without wrinkles, tears, or air pockets.

Install cap sheet, so side and end laps shed water.

* + - * 1. Laps: Accurately align roofing sheets, without stretching, and maintain uniform side and end laps.

Lap side laps as recommended by roof membrane manufacturer but not less than 3 inches.

Lap end laps as recommended by roof membrane manufacturer but not less than 12 inches.

Stagger end laps not less than 18 inches.

**[Heat-weld end laps,] [Completely bond and seal laps,]** leaving no voids.

Roll laps with a 20-pound roller.

Repair tears and voids in laps and lapped seams not completely sealed.

* + - * 1. Apply pressure to the body of the cap sheet according to manufacturer's instructions, to remove air pockets and to result in complete adhesion of base sheet to substrate.
			1. INSTALLATION OF FLASHING AND STRIPPING
				1. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to roofing system manufacturer's written instructions and as follows:

Smooth surfaces of masonry and concrete walls and parapets usually require priming before applying hot asphalt or cold adhesive.

Prime substrates with asphalt primer if required by roofing system manufacturer.

Retain "Backer Sheet Application" subparagraph below if a single backer sheet is required behind flashing sheet. Retain first option for backer sheets mechanically fastened to wood-surfaced walls or parapets; retain second option for adhered backer sheets.

Backer Sheet Application: **[Mechanically fasten backer sheet to walls or parapets. Adhere backer sheet over roofing membrane at cants] [Adhere backer sheet to substrate]** in **[a solid mopping of hot roofing asphalt] [cold-applied adhesive] [cold-applied polymer-modified adhesive]**.

Retain first subparagraph below for torch-applied flashing sheets.

Seal all laps.

Flashing Sheet Application, Hot: [Adhere flashing sheet to substrate in a solid mopping of hot roofing asphalt applied at asphalt temperature recommended by flashing sheet manufacturer. Apply hot roofing asphalt to back of flashing sheet if recommended by roofing system manufacturer] [Torch-apply flashing sheet to substrate].

Perform torch application according to NFPA 241, including two-hour fire watch after torches have been extinguished.

Flashing Sheet Application, Cold: Adhere flashing sheet to substrate in [cold-applied adhesive] [asphalt roofing cement] at rate required by roofing system manufacturer.

Revise dimensions in first paragraph below if required. Verify minimum and maximum height limits with manufacturers if necessary. NRCA recommends a minimum base-flashing height of 8 inches and a maximum of 24 inches.

* + - * 1. Extend base flashing up walls or parapets a minimum of 8 inches above roofing membrane and 4 inches onto field of roofing membrane.
				2. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.

Retain subparagraph below if not temporarily sealing upper termination of flashings awaiting counterflashing. Retain option if specifying termination seal.

Seal top termination of base flashing**[ with a strip of glass-fiber fabric set in asphalt roofing cement]**.

* + - * 1. Install liquid flashing system according to manufacturer's recommendations.

Extend liquid flashing not less than 3 inches in all directions from edges of item being flashed.

Embed granules, matching color of roof membrane, into wet compound.

Revise first paragraph below to describe a particular stripping arrangement if required. Manufacturers offer many variations of stripping-in metal flanges and horizontal legs of metal edgings. Some roofing manufacturers show metal items set on either a base sheet or a strip of modified bituminous membrane where water flow is toward, rather than away from, metal item. Cap sheet extends over metal, minimizing water flow against an exposed lap seam.

* + - * 1. Install roofing cap sheet stripping where metal flanges and edgings are set on roofing according to roofing system manufacturer's written instructions.

Delete "Roof Drains" paragraph below if there are no interior roof drains. NRCA recommends flashing size below, whereas some roofing manufacturers permit 27-inch square units.

* + - * 1. Roof Drains: Set **[30-by-30-inch] <Insert dimensions>** 4-pound lead flashing in bed of asphaltic adhesive on roofing.

Cover lead flashing with roofing cap sheet stripping, and extend a minimum of **[4 inches ] [6 inches]** beyond edge of metal flashing onto field of roofing.

Clamp roofing, metal flashing, and stripping into roof-drain clamping ring.

Install stripping according to roofing system manufacturer's written instructions.

* + - 1. INSTALLATION OF COATINGS

Retain this article if coatings are required.

* + - * 1. Apply coating to base flashings according to manufacturer's written instructions, by spray, roller, or other suitable application method.
			1. INSTALLATION OF INSULATION

Retain first paragraph below when required by roof membrane manufacturer.

* + - * 1. Loosely lay separator sheet over cooled roofing membrane, with minimum 2-inch side laps and 4-inch end laps.
				2. Loosely lay insulation over roof membrane, with long joints of insulation in continuous straight lines and with end joints staggered not less than 12 inches between rows.

Make joints between adjacent insulation boards not more than 1/4 inch in width.

Fill gaps exceeding 1/4 inch with insulation.

Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

Retain first paragraph below when two layers of insulation are required to achieve total roof/ceiling R value.

* + - * 1. Install upper layer of insulation with joints of each layer offset not less than 12 inches from previous layer of insulation.

Install with long joints continuous and with end joints staggered not less than 12 inches in adjacent rows.

Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

Make joints between adjacent insulation boards not more than 1/4 inch in width.

Fill gaps exceeding 1/4 inch with insulation.

Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

Retain paragraph below when required by roof membrane manufacturer.

* + - * 1. Install protection layer over insulation, overlapping edges and ends at least 12 inches.

Do not lap ends of fabric sheets within 72 inches of roof perimeter.

Extend fabric 2 to 3 inches above ballast at perimeter and penetrations.

Apply additional layer of fabric around penetrations to prevent aggregate from getting between penetration and insulation.

Do not cover drains or restrict water flow to drains.

* + - 1. INSTALLATION OF BALLAST

Retain this article if aggregate ballast or a combination of roof pavers and aggregate ballast are required, and delete "Roof Paver Installation" Article below. Loads and minimum roof perimeter and corner dimensions below are based on Dow's Tech Solutions 508.2. Revise if using ANSI/SPRI RP-4 or another design source, because requirements may vary.

Retain option in first paragraph below if roof paver ballast is required.

* + - * 1. Install aggregate ballast**[ and roof paver ballast]** uniformly over protection layer.
				2. Spread aggregate to not damage roof membrane or base flashings.
				3. Apply ballast as insulation is installed, leaving roof insulated and ballasted at end of workday.
				4. Install aggregate ballast at rate required by insulation manufacturer, but not less than the following:

Zone 1 (Roof Area Field): **[10 lb/sq. ft. of Size 5 aggregate] [12 lb/sq. ft. of Size 5 aggregate] [13 lb/sq. ft. of Size 2 aggregate] <Insert value>**.

Retain first option in subparagraphs below for insulation thicknesses of less than 3 inches. Retain second option for insulation thicknesses of 3 inches and more.

Zone 2 (Roof Area Perimeter): **[15 lb/sq. ft.] [20 lb/sq. ft.] [One row of roof pavers] [Two rows of roof pavers] [Three rows of roof pavers] [Four rows of roof pavers] <Insert value>** a distance of **<Insert dimension from "Wind Uplift Resistance" Paragraph included under "Performance Requirements" Article" above>** inside roof edge, but not less than 96 inches.

Aggregate: **[Size 5] [Size 4] [Size 2]**.

Mechanically fasten securement strapping to center of first perimeter row of roof pavers closest to edge of roof, using straps running parallel to parapet wall or roof edge.

Zone 3 (Roof Area Corners): **[15 lb/sq. ft.] [20 lb/sq. ft. ] [One row of roof pavers] [Two rows of roof pavers] [Three rows of roof pavers] [Four rows of roof pavers] <Insert value>** a distance of **<Insert dimension from "Wind Uplift Resistance" Paragraph included under "Performance Requirements" Article" above>** in each direction form a building corner, but not less than 96 inches.

Aggregate: **[Size 5] [Size 4] [Size 2]**.

Mechanically fasten securement strapping to center of first perimeter row of roof pavers closest to edge of roof, using straps running parallel to parapet wall or roof edge.

Within 48 Inches of Roof Penetrations: **[15 lb/sq. ft. ] [20 lb/sq. ft.] [Two rows of roof pavers around perimeter of penetration] <Insert value>**. A "penetration" is defined as any object projecting above the roof insulation that measures 48 inches or more on any side.

Aggregate: **[Size 5] [Size 4] [Size 2]**.

Retain "Roof Paver Walkways" paragraph below if required. Roofing manufacturers recommend walkway pavers in place of ballast in areas subject to service traffic.

* + - * 1. Roof Paver Walkways: Install walkway roof pavers using **[one row] [two rows]** of roof pavers, loosely laid and butted.

Install roof paver walkways at the following locations:

Retain one or more subparagraphs below. Revise to suit Project.

Perimeter of each rooftop unit.

Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.

Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.

Top and bottom of each roof access ladder.

Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.

Locations indicated on Drawings.

* + - 1. INSTALLATION OF ROOF PAVERS

Retain this article if covering entire roofed area with interlocking roof pavers instead of aggregate ballast. Roof perimeter and corner securement requirements are based on Dow's Tech Solutions 508.2. Coordinate weight of interlocking roof pavers with "Ballast" Article above to comply with minimum weight identified by Dow of 11 psf.

* + - * 1. Interlocking Roof Pavers: Install interlocking roof pavers over roofed area according to manufacturer's written instructions.

Retain one of first two paragraphs below for roof pavers installed over insulation. First paragraph corresponds to Dow's Tech Solutions 508.2, "PMR Ballast Design: Standard," and "PMR Ballast Design #1"; second paragraph corresponds to "PMR Ballast Design #2" and "PMR Ballast Design #3." Coordinate weight of roof pavers with "Ballast" Article above to comply with minimum weight identified by Dow of 18 psf for "PMR Ballast Design: Standard" and 22 psf for "PMR Ballast Design #1," "PMR Ballast Design #2," and "PMR Ballast Design #3."

* + - * 1. Install roof pavers over roofed area according to insulation manufacturer's written instructions.

Mechanically fasten securement strapping to center of first two perimeter rows and first two perimeter corner rows of roof pavers in each direction from corner, closest to edge of roof, using straps running parallel to parapet wall or roof edge.

Retain paragraph below if separate pedestals are required.

* + - * 1. Install roof pavers on pedestals set according to pedestal manufacturer's written instructions.
			1. INSTALLATION OF MORTAR-FACED BOARD INSULATION

Retain this article if using proprietary mortar-faced board insulation over entire roofed area.

* + - * 1. Install mortar-faced board insulation loosely laid, according to manufacturer's written instructions, with tongue-and-groove joints nested.

Stagger end joints of adjoining rows and abut insulation.

Retain one of or both subparagraphs below. Retain first subparagraph if securing mortar-faced board insulation with metal strapping at penetrations and perimeters. Revise below if a more elaborate description of perimeter edge conditions is required. Requirements differ, depending on whether a parapet wall or a gravel stop is detailed on Drawings. Coordinate inclusion of gravel stop or counterflashing for parapet with Section 076200 "Sheet Metal Flashing and Trim" or Section 077100 "Roof Specialties" as applicable.

Mechanically fasten metal securement strapping at penetrations and at perimeter edges of mortar-faced board insulation.

Retain subparagraph below if securing proprietary mortar-faced board insulation with roof pavers in addition to metal perimeter securement.

Over mortar-faced board insulation, install roof pavers on roof perimeter and corners according to manufacturer's written instructions.

Retain paragraph below if securing proprietary mortar-faced board insulation with roof pavers alone, which is manufacturer's preferred method of perimeter securement.

* + - * 1. Install **[one row] [two rows]** of 24-inch- wide roof pavers to roof perimeter, corners, and penetrations according to mortar-faced board insulation manufacturer's written instructions.
			1. FIELD QUALITY CONTROL

Retain this article if field inspecting and testing are required. Revise to suit local practices and requirements of authorities having jurisdiction if applicable. Quality-control inspections by roofing Contractor are already mandated in "General Installation Requirements" Article in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

Retain "Testing Agency" paragraph below to identify who will perform tests and inspections.

* + - * 1. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Director’s Representative.
				2. Perform the following tests:

Retain one or more of "Flood Testing," Infrared Thermography," Electrical Capacitance/Impedance Testing." "Nuclear Hydrogen Detection Testing." "Low-Voltage ELD Testing," and "High-Voltage Membrane Testing" subparagraphs below.

Retain "Flood Testing" subparagraph below if required. Localize testing to flashings or penetrations if preferred. Limit water depth to not more than load capacity of deck as determined by structural engineer. Review procedures in ASTM D5957 for applicability. Note that NRCA does not recommend flood testing.

Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.

Perform tests before overlying construction is placed.

Flood to an average depth of **[2-1/2 inches] <Insert depth>** with a minimum depth of **[1 inch] <Insert depth>** and not exceeding a depth of **[4 inches] <Insert depth>**. Maintain 2 inches of clearance from top of base flashing.

ASTM D5957 sets 24 hours as minimum and 72 hours as maximum duration for flood testing for waterproofing systems.

Flood each area for **[24] [48] [72]** hours.

After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.

Cost of retesting is the responsibility of the Contractor.

Testing agency to prepare survey report indicating locations of initial leaks, if any, and final survey report.

Infrared Thermography: Testing agency surveys entire roof area using infrared color thermography in accordance with ASTM C1153.

Perform tests before overlying construction is placed.

After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.

After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.

Cost of retesting is Contractor's responsibility.

Testing agency to prepare survey report of initial scan indicating locations of entrapped moisture, if any.

Retain "Electrical Capacitance/Impedance Testing" subparagraph or "Nuclear Hydrogen Detection Testing" subparagraph with infrared thermography if desired to verify results.

Electrical Capacitance/Impedance Testing: Testing agency surveys entire roof area for entrapped water within roof assembly according to ASTM D7954.

Perform tests before overlying construction is placed.

After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.

Cost of retesting is Contractor's responsibility.

Testing agency to prepare survey report indicating locations of entrapped moisture, if any.

Nuclear Hydrogen Detection Testing: Testing agency surveys entire roof area for entrapped water within roof assembly according to ANSI/SPRI/RCI NT-1.

Perform tests before overlying construction is placed.

After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.

Cost of retesting is Contractor's responsibility.

Testing agency to prepare survey report indicating locations of entrapped moisture, if any.

Retain "Low-Voltage ELD Testing" subparagraph below if required. First option is for platform-type system; second option is also referred to by the trademark brand name EFVM; third option is a handheld device, often used in conjunction with first option to test vertical areas. All options identify specific leak locations and require a conductive medium directly below the exposed roof membrane.

Low-Voltage ELD Testing: Testing agency surveys entire roof area and flashings to locate discontinuities in the roof membrane using low-voltage **[horizontal membrane scanning platform] [membrane electric field vector mapping] [or] [vertical membrane scanning]** in accordance with ASTM D8231.

Perform tests before overlying construction is placed.

After testing, repair areas of discontinuities, repeat tests, and make further repairs until roofing and flashing installations are contiguous.

Cost of retesting is Contractor's responsibility.

Testing agency to prepare survey report indicating locations of initial discontinuities, if any.

Retain "High-Voltage Membrane Testing" subparagraph below if required. This method requires a dry roof membrane, can be used on vertical surfaces, and identifies specific leak locations.

High-Voltage Membrane Testing: Testing agency surveys entire **[roof area,] [flashings,] [and] [parapet walls]** to locate discontinuity in the roof membrane using an electrically charged metal "broom head."

Perform tests before overlying construction is placed.

After testing, repair areas of discontinuities, repeat tests, and make further repairs until roofing and flashing installations are contiguous.

Cost of retesting is Contractor's responsibility.

Testing agency to prepare survey report indicating locations of initial discontinuities, if any.

"Test Cuts" paragraph below is based on Appendices 2 and 3 in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing." ARMA/NRCA recommends continuous visual examination of roofing installation. Test cuts are intended to evaluate problems observed during quality-assurance inspections.

* + - * 1. Test Cuts: Test specimens will be removed to evaluate problems observed during quality-assurance inspections of roofing membrane as follows:

Determine approximate quantities of components within roofing membrane according to ASTM D3617.

Examine test specimens for interply voids according to ASTM D3617 and to comply with criteria established in Appendix 3 in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."

Repair areas where test cuts were made according to roofing system manufacturer's written instructions.

A roof inspection is required by manufacturer before warranty issue. Revise scope of inspection and source of report to a qualified roofing consultant or an independent testing and inspection agency if preferred.

* + - * 1. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Director’s Representative, and to prepare inspection report.

Retain subparagraph below if Director’s Representative wants to be present during manufacturer's final inspection.

Notify Director’s Representative 48 hours in advance of date and time of inspection.

* + - * 1. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
				2. Roofing system will be considered defective if it does not pass tests and inspections.
				3. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.
			1. PROTECTING AND CLEANING
				1. Protect roofing system from damage and wear during remainder of construction period.

When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Director’s Representative.

* + - * 1. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

Retain paragraph below if coating flashing or if using fluid-applied bonding materials.

* + - * 1. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
			1. ROOFING INSTALLER'S WARRANTY

Retain this warranty or include another roofing Installer's warranty form if required. Coordinate with "Warranty" Article.

* + - * 1. WHEREAS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

Director’s Representative: **<Insert name of Director’s Representative>**.

Director’s Representative Address: **<Insert address>**.

Building Name/Type: **<Insert information>**.

Building Address: **<Insert address>**.

Area of Work: **<Insert information>**.

Acceptance Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Warranty Period: **<Insert time>**.

Expiration Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. AND WHEREAS Roofing Installer has contracted (either directly with Director’s Representative or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
				2. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Installer will, at Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
				3. This Warranty is made subject to the following terms and conditions:

Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

lightning;

Insert required wind speed in first subparagraph below.

peak gust wind speed exceeding **<Insert mph>**;

fire;

failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;

vapor condensation on bottom of roofing; and

activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Director’s Representative.

When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Director’s Representative or by another responsible party so designated.

Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

During Warranty Period, if Director’s Representative allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Director’s Representative engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Director’s Representative in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.

Director’s Representative shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.

This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Director’s Representative from other remedies and resources lawfully available to Director’s Representative in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Director’s Representative or a subcontract with Director’s Representative’s General Contractor.

* + - * 1. IN WITNESS THEREOF, this instrument has been duly executed this \_\_\_\_\_\_\_\_\_\_\_ day of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Authorized Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

END OF SECTION 075552.16