
PROJECT:	USC Coker Life Sciences Building Roof Replacement	NO.:	02
OWNER:	University of South Carolina (USC)	DATE OF ISSUANCE:	3/30/2021
		ENGINEER:	REI Engineers
		REI PROJECT NO:	20CHS-072

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated 1/28/2021 as noted below.

This addendum consists of 18 page(s), the attached revised Specification Sections SE-330 Lump Sum Bid From and 07 52 16 Modified Bitumen Roofing REV 3-30-21.

CHANGES TO BIDDING REQUIREMENTS:

1. DELETE SE-330 Lump Sum Bid From and ADD SE-330 Lump Sum Bid From rev 3-30-21

CHANGES TO SPECIFICATIONS:

1. DELETE Section 07 52 16- Modified Bitumen Roofing and ADD Section 07 52 16- Modified Bitumen Roofing rev 3-30-21.
2. In Section 01 11 00- Summary of Work, DELETE 1.1, E, 1, f and REPLACE with "Provide a cold applied or torch applied two-ply modified bitumen roof membrane along with flashings and accessories."
3. In Section 01 11 00- Summary of Work, DELETE 1.1, E, 4, f and REPLACE with "Provide a cold applied or torch applied two-ply modified bitumen roof membrane along with flashings and accessories."
4. In Section 01 23 00- Alternates, DELETE 3.1, B, f and REPLACE with "Provide a cold applied or torch applied two-ply modified bitumen roof membrane along with flashings and accessories".

CHANGES TO CONTRACT DRAWINGS:

1. N/A

QUESTIONS/CLARIFICATIONS

(Q)= Question

(R)= Response

(Q)= I notice this is a torch-applied project. Can we install a cold-applied system on this project?

(R)= Refer to "07 52 16 Modified Bitumen Roofing REV 3-30-21" for cold-applied requirements.

ALL OTHER REQUIREMENTS AND PROVISIONS OF THE BIDDING DOCUMENTS REMAIN UNCHANGED. ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID FORM. FAILURE TO DO SO MAY BE CAUSE FOR REJECTION OF THE BID.

END OF ADDENDUM

SE-330 LUMP SUM BID FORM

Bidders shall submit bids on only Bid Form SE-330.

BID SUBMITTED BY: _____
(Bidder's Name)

BID SUBMITTED TO: _____
(Agency's Name)

FOR: PROJECT NAME: USC Coker Life Sciences Building Roof Replacement
PROJECT NUMBER: H27-Z422/ 50003410-2

OFFER

§ 1. In response to the Invitation for Construction Services and in compliance with the Instructions to Bidders for the above-named Project, the undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract with the Agency on the terms included in the Bidding Documents, and to perform all Work as specified or indicated in the Bidding Documents, for the prices and within the time frames indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

§ 2. Pursuant to SC Code § 11-35-3030(1), Bidder has submitted Bid Security as follows in the amount and form required by the Bidding Documents:

Bid Bond with Power of Attorney **Electronic Bid Bond** **Cashier's Check**

(Bidder check one)

§ 3. Bidder acknowledges the receipt of the following Addenda to the Bidding Documents and has incorporated the effects of said Addenda into this Bid:

(Bidder, check all that apply. Note, there may be more boxes than actual addenda. Do not check boxes that do not apply)

ADDENDA: #1 #2 #3 #4 #5

§ 4. Bidder accepts all terms and conditions of the Invitation for Bids, including, without limitation, those dealing with the disposition of Bid Security. Bidder agrees that this Bid, including all Bid Alternates, if any, may not be revoked or withdrawn after the opening of bids, and shall remain open for acceptance for a period of **60** Days following the Bid Date, or for such longer period of time that Bidder may agree to in writing upon request of the Agency.

§ 5. Bidder herewith offers to provide all labor, materials, equipment, tools of trades and labor, accessories, appliances, warranties and guarantees, and to pay all royalties, fees, permits, licenses and applicable taxes necessary to complete the following items of construction work:

§ 6.1 **BASE BID WORK** (as indicated in the Bidding Documents and generally described as follows): Roof Areas B, C, D, E, and F: Remove and dispose of the existing roof system including flashings and sheet metal down to the existing structural deck; Provide a torch applied vapor retarder; Provide base layer insulation adhered in foam adhesive; Provide second layer insulation adhered in foam adhesive; Provide overlayment insulation adhered in foam adhesive; Provide a cold applied or torch applied two-ply modified bitumen roof membrane along with flashings and accessories; Replace sheet metal flashings and trim; Drawings; Provide a complete, watertight, 20-year warrantable roof assembly.

\$ _____, which sum is hereafter called the Base Bid.

(Bidder to insert Base Bid Amount on line above)

**SE-330
LUMP SUM BID FORM**

Bidders shall submit bids on only Bid Form SE-330.

§ 6.2 **BID ALTERNATES** as indicated in the Bidding Documents and generally described as follows:

ALTERNATE # 1 (Brief Description): Provide new metal wall panels at interior screen walls on Sector C

ADD TO or **DEDUCT FROM BASE BID: \$** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 2 (Brief Description): Roof Area A: Remove and dispose of the existing roof/ sheet metal/ flashing system down to the deck; provide specified roof system with flashings and accessories; provide a complete, watertight, 20-year warrantable roof assembly.

ADD TO or **DEDUCT FROM BASE BID: \$** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

ALTERNATE # 3 (Brief Description): _____

ADD TO or **DEDUCT FROM BASE BID: \$** _____

(Bidder to mark appropriate box to clearly indicate the price adjustment offered for each Alternate)

§ 6.3 **UNIT PRICES:**

BIDDER offers for the Agency’s consideration and use, the following **UNIT PRICES**. The **UNIT PRICES** offered by **BIDDER** indicate the amount to be added to or deducted from the **CONTRACT SUM** for each item-unit combination. **UNIT PRICES** include all costs to the Agency, including those for materials, labor, equipment, tools of trades and labor, fees, taxes, insurance, bonding, overhead, profit, etc. The Agency reserves the right to include or not to include any of the following **UNIT PRICES** in the Contract and to negotiate the **UNIT PRICES** with **BIDDER** prior to including in the Contract.

No.	ITEM	UNIT OF MEASURE	ADD	DEDUCT
1.	Replace Deteriorated Wood Blocking	BF	\$	\$
2.	Provide Additional Walk Pad Material	SF	\$	\$
3.	Provide 1/8" Steel Plates for Deck Openings	SF	\$	\$
4.	_____	_____	\$	\$
5.	_____	_____	\$	\$
6.	_____	_____	\$	\$

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LUMP SUM BID FORM**

§ 7. LISTING OF PROPOSED SUBCONTRACTORS PURSUANT TO SECTION 3020(b)(i), CHAPTER 35, TITLE 11 OF THE SOUTH CAROLINA CODE OF LAWS, AS AMENDED
(See Instructions on the following page BF-2A)

Bidder shall use the below-listed Subcontractors in the performance of the Subcontractor Classification work listed:

(A) SUBCONTRACTOR LICENSE CLASSIFICATION or SUBCLASSIFICATION NAME <i>(Completed by Agency)</i>	(B) LICENSE CLASSIFICATION or SUBCLASSIFICATION ABBREVIATION <i>(Completed by Agency)</i>	(C) SUBCONTRACTOR and/or PRIME CONTRACTOR <i>(Required - must be completed by Bidder)</i>	(D) SUBCONTRACTOR'S and/or PRIME CONTRACTOR'S SC LICENSE NUMBER <i>(Requested, but not Required)</i>
BASE BID			
ALTERNATE #1			
ALTERNATE #2			
ALTERNATE #3			

If a Bid Alternate is accepted, Subcontractors listed for the Bid Alternate shall be used for the work of both the Alternate and the Base Bid work.

SE-330 LUMP SUM BID FORM

INSTRUCTIONS FOR SUBCONTRACTOR LISTING

1. Section 7 of the Bid Form sets forth an Agency-developed list of subcontractor license classifications or subclassifications for which Bidder is required to identify the entity (subcontractor(s) and/or himself) Bidder will use to perform this work.
 - a. **Columns A & B:** The Agency fills out these columns to identify the subcontractor license classification/subclassification and related license abbreviation for which the Bidder must list either a subcontractor or himself as the entity that will perform this work. In Column A, the subcontractor license classification/subclassification is identified by name and in Column B, the related contractor license abbreviation (per Title 40 of the SC Code of Laws) is listed. Abbreviations of licenses can be found at: <https://lcr.sc.gov/clb/PDFFiles/CLBClassificationAbbreviations.pdf>. If the Agency has not identified a subcontractor license classification/subclassification, the Bidder does not list a subcontractor.
 - b. **Columns C and D:** In these columns, the Bidder identifies the subcontractors it will use for the work of each license listed by the Agency in Columns A & B. Bidder must identify only the subcontractor(s) who will perform the work and no others. Bidders must make sure that their identification of each subcontractor is clear and unambiguous. A listing that could be any number of different entities may be cause for rejection of the bid as non-responsive. For example, a listing of M&M without additional information may be problematic if there are multiple different licensed contractors in South Carolina whose names start with M&M.
2. **Subcontractor Defined:** For purposes of subcontractor listing, a subcontractor is an entity who will perform work or render service to the prime contractor to or about the construction site pursuant to a contract with the prime contractor. Bidder should not identify sub-subcontractors in the spaces provided on the bid form but only those entities with which Bidder will contract directly. Likewise, do not identify material suppliers, manufacturers, and fabricators that will not perform physical work at the site of the project but will only supply materials or equipment to the Bidder or proposed subcontractor(s).
3. **Subcontractor Qualifications:** Bidder must only list subcontractors who possess a South Carolina contractor's license that includes the license classification and/or subclassification identified by the Agency in Columns A & B. The subcontractor license must also be within the appropriate license group for the work. If Bidder lists a subcontractor who is not qualified to perform the work, the Bidder will be rejected as non-responsible.
4. **Use of Own forces:** If, under the terms of the Bidding Documents and SC Contractor Licensing laws, Bidder is qualified to perform the work of a listed subcontractor classification or subclassification and Bidder does not intend to subcontract such work but to use Bidder's own employees to perform such work, the Bidder must insert itself in the space provided.
5. **Use of Multiple Subcontractors:**
 - a. If Bidder intends to use multiple subcontractors to perform the work of a single license classification/subclassification, Bidder must insert the name of each subcontractor Bidder will use, preferably separating the name of each by the word "and". If Bidder intends to use both his own employees to perform a part of the work of a single license classification/subclassification and to use one or more subcontractors to perform the remaining work, Bidder must insert itself and each subcontractor, preferably separating them with the word "and". Bidder must use each entity listed for the work of a single license classification/subclassification in the performance of that work.
 - b. **Optional Listing Prohibited:** Bidder may not list multiple subcontractors for a license classification/subclassification in a form that provides the Bidder the option, after bid opening or award, to choose one or more but not all the listed subcontractors to perform the work for which they are listed. A listing, which on its face requires subsequent explanation to determine whether it is an optional listing, is non-responsive. If Bidder intends to use multiple entities to perform the work for a single listing, Bidder must clearly set forth on the bid form such intent. Bidder may accomplish this by simply inserting the word "and" between the names of each entity listed. Agency will reject as non-responsive a listing that contains the names of multiple subcontractors separated by a blank space, the word "or", a virgule (that is a /), or any separator that the Agency may reasonably interpret as an optional listing.
6. If Bidder is awarded the contract, Bidder must, except with the approval of the Agency for good cause shown, use the listed entities to perform the work for which they are listed.
7. If Bidder is awarded the contract, Bidder will not be allowed to substitute another entity as subcontractor in place of a subcontractor listed in Section 7 of the Bid except for one or more of the reasons allowed by the SC Code of Laws.
8. Bidder's failure to identify an entity (subcontractor or himself) to perform the work of a subcontractor listed in Columns A & B will render the Bid non-responsive.

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§ 8. LIST OF MANUFACTURERS, MATERIAL SUPPLIERS, AND SUBCONTRACTORS OTHER THAN SUBCONTRACTORS LISTED IN SECTION 7 ABOVE (*FOR INFORMATION ONLY*):

Pursuant to instructions in the Invitation for Construction Services, if any, Bidder will provide to Agency upon the Agency's request and within 24 hours of such request, a listing of manufacturers, material suppliers, and subcontractors, other than those listed in Section 7 above, that Bidder intends to use on the project. Bidder acknowledges and agrees that this list is provided for purposes of determining responsibility and not pursuant to the subcontractor listing requirements of SC Code § 11-35-3020(b)(i).

§ 9. TIME OF CONTRACT PERFORMANCE AND LIQUIDATED DAMAGES

a) CONTRACT TIME

Bidder agrees that the Date of Commencement of the Work shall be established in a Notice to Proceed to be issued by the Agency. Bidder agrees to substantially complete the Work within 120 Calendar Days from the Date of Commencement, subject to adjustments as provided in the Contract Documents.

b) LIQUIDATED DAMAGES

Bidder further agrees that from the compensation to be paid, the Agency shall retain as Liquidated Damages the amount of \$ 500.00 for each Calendar Day the actual construction time required to achieve Substantial Completion exceeds the specified or adjusted time for Substantial Completion as provided in the Contract Documents. This amount is intended by the parties as the predetermined measure of compensation for actual damages, not as a penalty for nonperformance.

§ 10. AGREEMENTS

- a) Bidder agrees that this bid is subject to the requirements of the laws of the State of South Carolina.
- b) Bidder agrees that at any time prior to the issuance of the Notice to Proceed for this Project, this Project may be canceled for the convenience of, and without cost to, the State.
- c) Bidder agrees that neither the State of South Carolina nor any of its agencies, employees or agents shall be responsible for any bid preparation costs, or any costs or charges of any type, should all bids be rejected or the Project canceled for any reason prior to the issuance of the Notice to Proceed.

§ 11. ELECTRONIC BID BOND

By signing below, the Principal is affirming that the identified electronic bid bond has been executed and that the Principal and Surety are firmly bound unto the State of South Carolina under the terms and conditions of the AIA Document A310, Bid Bond, included in the Bidding Documents.

ELECTRONIC BID BOND NUMBER: _____

SIGNATURE AND TITLE: _____

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LUMP SUM BID FORM**

CONTRACTOR'S CLASSIFICATIONS AND SUBCLASSIFICATIONS WITH LIMITATION

SC Contractor's License Number(s): _____

Classification(s) & Limits: _____

Subclassification(s) & Limits: _____

By signing this Bid, the person signing reaffirms all representation and certification made by both the person signing and the Bidder, including without limitation, those appearing in Article 2 of the SCOSE Version of the AIA Document A701, Instructions to Bidders, is expressly incorporated by reference.

BIDDER'S LEGAL NAME: _____

ADDRESS: _____

TELEPHONE: _____

EMAIL: _____

SIGNATURE: _____ **DATE:** _____

PRINT NAME: _____

TITLE: _____

6.4 ALLOWANCES:

BIDDER:

- A. Quantity allowance for the items indicated below shall be included in the base bid. The unit price submitted on the Bid Form shall be used to compute the quantity allowances. The quantities indicated are estimated quantities only for the purpose of comparing bids. The Contractor will be compensated at the unit price bid for the exact quantity of work performed under each unit price item.
1. Replace 750 BF of Deteriorated Wood Blocking. Refer to Section 06 10 00.
 2. Provide 250 SF of Additional Manufacturer's Walk Pad Material. Refer to Section 07 52 16.
 3. Provide 250 SF of Steel Plates for Concrete Deck Openings. Refer to Section 07 01 50.

SECTION 07 52 16

MODIFIED BITUMEN ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prime concrete deck and provide torch applied vapor barrier.
- B. Provide a cold adhesive or torch applied SBS modified bituminous membrane system consisting of two plies of asphalt elastomeric membrane reinforced with polyester and/or fiberglass mat.

1.2 RELATED SECTIONS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to this Section, including but not limited to:

1.	Rough Carpentry	Section 06 10 00
2.	Preparation for Reroofing	Section 07 01 50
3.	Roof Insulation	Section 07 22 16
4.	Sheet Metal Flashing and Trim	Section 07 62 00
5.	Roof Accessories	Section 07 72 00

1.3 REFERENCES

- A. Refer to the following references, current edition for specification compliance:
 - 1. 2018 International Building Codes with SC Modifications
 - 2. National Roofing Contractors Association – NRCA
 - a. NRCA Roofing and Waterproofing Manual
 - 3. ASTM International
 - a. ASTM D 41 Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - b. ASTM E 108 Standard Test Methods for Fire Tests of Roof Coverings
 - c. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction Materials.
 - d. ASTM D 3019 Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos Fibered and Non-Asbestos Fibered.
 - e. ASTM D 3409 Standard Test Method for Adhesion of Asphalt-Roof Cement to Damp, Wet, or Underwater Surfaces.
 - f. ASTM D 4479 Standard Specification for Asphalt Roof Coatings – Asbestos Free.
 - g. ASTM D 4586 Specification for Asphalt Roofing Cement, Asbestos Free.
 - h. ASTM D 6162 Specification for SBS Modified Bitumen Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
 - i. ASTM D 6163 Specification for SBS Modified Bitumen Sheet Materials Using Glass Fiber Reinforcements.
 - j. ASTM D 6164 Specification for SBS Modified Bitumen Sheet Materials Using Polyester Reinforcements.
 - 4. Asphalt Roofing Manufacturers Association – ARMA
 - 5. FM Global

- a. FM 4450 – Approval Standard for Class 1 Insulated Steel Deck Roofs
 - b. FM 4470 – Approval Standard for Class 1 Roof Coverings
6. Underwriters Laboratories, Inc. – UL
- a. UL 580 – Test for Uplift Resistance of Roof Assemblies
 - b. UL 790 – Tests for Fire Resistance of Roof Covering Materials
 - c. UL 1897 – Uplift Resistance for Roof Covering Systems

1.4 PERFORMANCE REQUIREMENTS

- A. Install roofing system to meet UL 790 Class A/ASTM E 108 Class A Fire Rating.
- B. Wind Design: Install roofing system to meet or exceed the requirements of the current adopted version of ASCE-7, and shall be an approved assembly tested to the wind uplift pressures listed below:
 - 1. Field of Roof: -48.5psf.
 - 2. Perimeter of Roof: -76.1psf.
 - 3. Corner of Roof: -103.7psf.

1.5 SUBMITTALS

- A. Refer to Section 01 33 00-Submittal Procedures for Submittals.
- B. Latest edition of the Manufacturer's current material specifications and installation instructions.
- C. Manufacturer's Product Data Sheets for all materials specified certifying material complies with all specified requirements.
- D. Submit documentation of approved, tested roof system to meet the specified requirements for the following:
 - 1. Wind uplift pressures
 - 2. UL Fire Resistance Rating

1.6 QUALITY ASSURANCE

- A. Roofing applicator shall be approved by the material manufacturer. Additionally, roofing applicator shall have the experience of 5 similar roof projects. Verification shall be provided to the Engineer upon request.
- B. Manufacturer shall have been producing modified bitumen products in the United States for a minimum of 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years without a change in the basic product design or SBS modified bitumen blend (e.g. no substantive changes in product composition, polymer specification, asphalt or filler formulation).
- C. The base ply and flashing reinforcing ply shall be fully inspected by the Contractor and Manufacturer's technical representative and repaired and prepared to meet the Manufacturer's requirements prior to installing the surface ply.
- D. The base ply shall not be exposed for longer than the manufacturer's maximum requirement for exposure and shall be acceptable for surface ply applications. Any base ply exposed longer than the maximum requirement will be subject to rejection or additional remedial requirements prior to application of the surface ply.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery. Materials shall be delivered in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.
- B. Storage: Store materials out of direct exposure to the elements on pallets at least 4 inches above ground level at site location acceptable to the Owner.
 - 1. Storage trailers are acceptable provided they are equipped with a lock and located at a site location acceptable to the Owner.
 - 2. Utilize tarps that will completely cover materials to prevent moisture contamination. Remove or slit factory shrouds and/or visqueen; do not use these materials as tarps.
 - 3. Install vapor retarders under material storage areas located on the ground.
 - 4. Store roll goods on end on a clean flat surface.
 - 5. Remove damaged or deteriorated materials from the job site.
- C. Handling. Material shall be handled in such manner as to preclude damage and contamination with moisture or foreign matter.

1.8 PROJECT CONDITIONS

- A. Environmental Requirements
 - 1. Roofing shall not be applied during precipitation and shall not be started in the event there is a probability of precipitation during applications.
 - 2. The membrane shall not be applied at or below the dew point temperature.
 - 3. When conditions are damp and where adjacent roof areas have moisture or dew, the roof shall be fully dried to prevent tracking water over the membrane substrates.
 - 4. At ambient temperatures of 40°F and below, including wind chill, take all precautions to ensure all adhesives and other materials maintain the minimum acceptable temperature at the point of roofing application as recommended by the membrane manufacturer.
- B. Protection
 - 1. Protect against staining and mechanical damage of adjacent surfaces and work areas during application. Staining, mechanical damage, or discoloration of the membrane shall be cause for rejection.
 - 2. Prevent smoke and other fumes/odors from entering facility by coordinating with Facility representative and by temporary intake shut down and/or covering intake.
 - 3. Protect materials being installed and storage of materials against wind related damage.
- C. Torch Operation and Safety
 - 1. Refer to Section 01 35 00-Hot Work Operations for torch operation and safety.

1.9 WARRANTY

- A. Manufacturer's Guarantee: Manufacturer's standard form, non-pro-rated, without monetary limitation or deductibles, in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks or breaches in the primary roof membrane causing moisture to enter the substrate below (even if visible leaks are not observed inside the facility). Warranty to remain in effect for wind speeds up to 72 mph. Warranties requiring the Owner's signature will not be acceptable.

1. Warranty to include but not be limited to membrane, insulation, vapor barrier, mastics, adhesives, fasteners, sealants, base flashings, etc.
2. Warranty Period: Twenty years from date of Substantial Completion
3. Manufacturer's Representative shall attend two post construction field inspections: the first no earlier than twenty-three (23) months and no later than twenty-four (24) months after the date of Substantial Completion and the second no earlier than fifty-nine (59) months and no later than sixty (60) months. Submit a written report within seven (7) days of the site visits to the Engineer listing observations, conditions and any recommended repairs or remedial action.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements herein, the following manufacturers are approved:

1. Johns Manville (JM)
2. Siplast
3. Soprema, Inc.

2.2 MEMBRANE MATERIALS

A. Vapor Retarder: Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163 or D 6164, Type I or II, Grade S.

1. JM Dynaweld Base
2. Siplast Paradiene 20 TG
3. Soprema Elastophene SP 3.0

B. Roof Membrane Assembly:

1. A dimensionally stable roof membrane assembly consisting of 2 plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane secured to a prepared substrate. Both reinforcement mats shall be impregnated and coated each side with a high-quality SBS modified bitumen blend.
2. The roof system shall pass ASTM D 5849, Resistance to Cyclic Joint Displacement at 14°F. Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles as manufactured and 200 cycles after heat conditioning according to ASTM D 5147.
3. Base Ply Membrane (Cold Adhesive): Glass fiber and/or polyester reinforced ply sheet manufactured for cold adhesive/hot asphalt application, meeting or exceeding requirements of ASTM D 6163 or D 6164, Type I or II, Grade S.
 - a. JM Dynalastic 180 S
 - b. Siplast Paradiene 20
 - c. Soprema Elastophene Sanded
4. Base Ply Membrane (Torch Applied): Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163, D 6164, Type I or II, Grade S.
 - a. JM Dynaweld Base
 - b. Siplast Paradiene 20 TG
 - c. Soprema Elastophene Flam
5. Base Ply Membrane (Self-Adhering)- At Cants: Self adhering, glass fiber and/or

polyester reinforced ply sheet, meeting or exceeding requirements of ASTM D 6163 or ASTM D 6164, Type I or II, Grade S.

- a. JM Dynagrip SD/SA
- b. Siplast Paradiene 20 SA
- c. Soproma Sopralene Stick

6. Surface Ply Membrane (Cold Adhesive): Glass fiber and/or polyester reinforced ply sheet manufactured for cold-adhesive application, meeting or exceeding requirements of ASTM D 6163, D6164, Type I or II, Grade G. Granules to be white.

- a. JM Dynaglas FR
- b. Siplast Paradiene 30 FR
- c. Soproma Elastophene LS FR GR

7. Surface Ply Membrane (Torch Application): Glass fiber and/or polyester reinforced ply sheet manufactured for torch application, meeting or exceeding requirements of ASTM D 6163, D6164, Type I or II, Grade G. Granules to be white.

- a. JM Dynaweld Cap FR
- b. Siplast Paradiene 30 FR TG
- c. Soproma Elastophene Flam FR GR

C. Flashing shall consist of:

1. Reinforcing/Stripping Ply (Torch Application):

- a. JM Dynabase HW
- b. Siplast Paradiene 20 TG
- c. Soproma Sopralene Flam 180

2. Flashing/Target Ply (Torch Application):

- a. JM Dyanweld Cap 180 FR
- b. Siplast Parafor 50 LT
- c. Soproma 180 Flam GR

D. Fluid Applied Flashing System: Shall be membrane manufacturer's polyurethane or PMMA based resin with polyester fleece flashing system.

1. JM SeamFree PMMA Liquid Membrane
2. Siplast Parapro
3. Soproma Alsan RS

2.3 RELATED MATERIALS

A. Cold Adhesive: Membrane manufacturer's standard low-VOC adhesive, specifically used for adhering membrane plies. Adhesive must be acceptable by membrane manufacturer for inclusion in warrantable system.

1. JM MBR Cold Application Adhesive
2. Siplast PA 311 M
3. Soproma Colply Membrane Adhesive

B. Asphalt primer: Shall meet ASTM D-41 requirements and be approved for intended use by membrane manufacturer.

- C. Solvent Free Adhesive: A single component, solvent-free modified asphalt adhesive designed for application of the specified roof membrane in areas below the fluid applied flashing.
- D. Utility Roof Cement: An asphalt cutback general utility mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges and temporary seals conforming to ASTM D 4586 Type II requirements.
- E. Sealant: An SBS polymer modified asphaltic flashing cement in a 10.4-ounce cartridge conforming to ASTM 4586 requirements approved by the roofing membrane manufacturer for use in conjunction with the roofing membrane materials.
- F. Ceramic granules: Shall be of color scheme matching the granule surfacing of the cap sheet comparable to No. 11 granules.
- G. Walk Pad Material: Shall be a prefabricated (by the membrane manufacturer), puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic granule wearing surface.

2.4 FASTENERS

- A. Base Flashing Fasteners (Wood): Shall be galvanized ring shank nail with one-inch diameter cap, such as Regular Round Head Fasteners as manufactured by Simplex Nails. Fastener length shall be one inch minimum and must be approved by the membrane manufacturer for inclusion in warranty.
- B. Base Flashing Fasteners (Concrete/Masonry): Shall be 1/4" diameter metal-based expansion anchor for use in concrete or masonry substrates with length to penetrate substrate a minimum of 1-1/2".
- C. Termination Bar: 1/8" X 1" aluminum or stainless-steel flat bar with pre-drilled oversized or slotted holes 8" on center.

PART 3 EXECUTION

3.1 EXAMINATION

- A. A pre-job conference including the Engineer, Contractor, and the membrane manufacturer's representative shall be conducted prior to the application of the roofing.
- B. Contractor shall verify that work penetrating the roof deck or work which may otherwise affect the roofing has been properly completed.
- C. Contractor shall inspect insulation system substrate prior to application of membrane. Commencement of work signifies Contractor's acceptance of substrate. Any defects in roofing work resulting from such accepted substrates shall be corrected to Owner's satisfaction at no additional expense.

3.2 PREPARATION

- A. General. All surfaces shall be swept or vacuumed prior to commencement of roofing.
- B. Contractor shall coordinate closure of air intakes prior to application of primer and cold adhesives.
- C. All membranes shall be unrolled and allowed to relax in accordance with membrane manufacturer's recommendations or a minimum of thirty minutes, whichever is greater.

- D. Where walls, curbs, expansion joints, etc. present an unacceptable substrate for flashing and where flashings substrates are combustible, a layer of non-combustible overlayment insulation shall be fastened to provide a suitable substrate for flashing.

3.3 APPLICATION

A. General:

1. Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of the roofing membrane base ply shall immediately follow application of vapor retarder/insulation system as a continuous operation.
2. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, etc.), and exercise care in ensuring that the finished application is acceptable to the Owner. Excessive footprints or impressions in the surface ply will be grounds for rejection thereby requiring complete membrane tear-off and replacement.
3. Priming:
 - a. Prime metal flanges, concrete and masonry surfaces with a uniform coating of asphalt primer.
 - b. Primer shall provide full coverage to ensure surfaces are dark brown to black. No less than 1 to 1-1/4 gallons per square will be accepted.
 - c. Allow primer to fully dry prior to application of asphalt/adhesive.
4. Inspect membrane and flashing application each day. Repair all deficiencies daily prior to beginning or resuming other work.
 - a. Membrane deficiencies shall be cut open and removed as necessary.
 - b. Repairs shall extend from lap to lap.

B. Vapor Barrier:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply all layers of roofing free of wrinkles, creases or fishmouths.
3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Apply all layers of roofing perpendicular to the slope of the deck.
5. Fully bond to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the torch or self-adhesive applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

C. Roof Membrane:

1. Apply membrane in accordance with the manufacturer's instructions and the following requirements.
2. Apply all layers of roofing free of wrinkles, creases or fishmouths.
3. Exert sufficient pressure by use of roller or broom on the roll during application to ensure prevention of air pockets.
4. Stagger the lap seams between the base ply layer and the finish ply layer.
5. Apply all layers of roofing perpendicular to the slope of the deck.
6. Fully bond the base ply to the prepared substrate, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the cold adhesive or torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges.

Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

7. Fully bond the surface ply to the base ply, utilizing minimum 3-inch side and end laps. Apply each sheet directly behind the cold adhesive or torch applicator. Stagger end laps of the surface ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the surface ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the surface ply a minimum 3 feet from end laps in the underlying base ply.
8. All membrane laps shall be hot air welded. Follow membrane manufacturer's procedures for hot air welding of laps.

D. Cold Adhesive Application:

1. Application shall meet the membrane manufacturer's published instructions.
2. Membrane adhesive shall be applied by 3/8" notched soft rubber squeegee.
3. Apply cold adhesive in a smooth, even, continuous layer without breaks or voids.
4. Utilize an application rate of 2 to 2 1/2 gal/sq (0.6 to 1.0 l/m²) over irregular or porous substrates. Utilize an application rate of 1 1/2 to 2 gal/sq (0.6 to 0.8 kg/m²) for interply applications. Double the adhesive application rate at the end laps of granule surfaced sheets. Contractor shall be responsible for varying application rates based on conditions present.
5. Contractor shall inspect and change squeegee blades daily. Squeegee blades shall be replaced more frequently as the notches are worn down less than 3/8".
6. Apply cold adhesives between ambient temperatures of approximately 40°F to 100°F.
7. Minimize foot traffic in areas where adhesive has been installed.
8. Cold Adhesive Application in areas to receive fluid applied flashing: In the areas surrounding details that are to receive the catalyzed acrylic resin primer and flashing system, apply membrane plies in a full coating of the specified solvent free adhesive in lieu of the solvent based adhesive a minimum 8 inches from the base of the penetration or curb.

E. Torch Application:

1. Utilize heat welders experienced in torch application.
2. Warm the surface to which the membrane is being applied, preheat portions of the roll which are about to be applied and melt the modified asphalt on the back of the sheet which will be used to adhere the membrane. The area of the roll where the modified asphalt is being melted is the most critical. Roll must be heated evenly across the entire width of the sheet being heat welded.
3. Ensure a small bead of asphalt precedes the roll as it is laid down. Bead of asphalt shall be visible to the applicator and should flow out on both sides of the sheet.
4. Granule Embedment: Embed granules at all locations where membrane material will be installed over a granulated surface and a selvage edge is not present. Using a torch or embedment tool, heat the area and push the granules down into the heated bitumen. Do not scrape or remove the granules from the surface.

F. Water cut-off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

G. Flashings: Shall be installed concurrently with the membrane installation.

1. Prior to installing flashings over plywood substrates, install a layer of rosin paper and base sheet. Secure materials to plywood with approved fasteners at 6" on center staggered in all directions.

2. Prior to torch application along cant strips, provide self-adhered flashing ply in accordance with the below requirements.
3. Base flashing shall be accomplished using a reinforcing ply and flashing ply. The reinforcing sheet shall be lapped a minimum of three (3) inches to itself and shall extend a minimum of four (4) inches onto the base ply surface from the base of the cant and a minimum of three (3) inches up the vertical termination above the toe of the cant. The flashing sheet shall be lapped a minimum of three (3) inches to itself and shall extend a minimum of six (6) inches from the toe of the cant onto the surface ply surface and a minimum of three (3) inches up the vertical termination above the toe of the cant or as noted in the detail drawings. Lap seams in the reinforcing layer shall never coincide with the laps of the flashing layer. The reinforcing sheet and flashing sheet shall be adhered by cold adhesive (in accordance with the manufacturer's guidelines). All flashing sheets shall be cut off the end of the roll and be applied vertically, always working to a selvage edge.
4. Base flashing shall be mechanically terminated a minimum of eight (8) inches above the finished roof surface.
 - a. Wood Substrate: Base flashing shall be mechanically terminated using approved fasteners eight (8) inches on center. Fastener heads shall be covered with a three-course roof cement and fabric.
 - b. Concrete/Masonry Substrate: Base flashing shall be mechanically terminated using approved fasteners and termination bar.
5. Base flashing shall be terminated at all roof edges by extending the base flashing at least two inches beyond the edge of the roof and mechanically attaching a termination bar vertically with appropriate fasteners eight inches on center. Provide a continuous bead of sealant along outside edge of termination bar.
6. Sheet metal incorporated into the roofing system shall be sealed off with stripping ply. Stripping plies shall be installed in roof cement and fit tight to the edge of the sheet metal. The stripping ply shall extend four inches beyond sheet metal onto roof membrane. Stripping ply shall be installed prior to application of surface ply.
7. Provide sealant installed to fill void between edge of sheet metal and surface ply edge (i.e. at metal edge, pipe penetrations, etc.) properly tooled to ensure adhesion and slope to shed water. Broadcast granules into properly installed sealant.

H. Fluid Applied Flashing Application

1. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.
2. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.
3. Refer to manufacturer's installation instructions for application rates and additional installation information.
4. Broadcast granules into horizontal surface of fluid to match adjacent surface ply.

I. Roof Drain

1. Provide roof drain flashings as indicated in detail drawing. Refer to the above requirements for fluid applied flashings.
2. Replace clamping ring and strainer dome to match existing roof manufacturer and model with cast iron clamping ring and strainer dome with stainless steel clamping ring bolts.

J. Walk Pad Material

1. Apply walk pad material to a clean, dry surface.
2. Prior to application, cut walk pad material into maximum 5' lengths and allow to

relax until flat. A straight edge or chalk line should be used to ensure straight square cuts. Do not cut the walk pad material directly on the roof surface.

3. Position walk pad material so as to leave minimum 2" gaps between panels to allow for proper drainage.
 4. Adhere walk pad panels to surface ply with roof cement applied to the back of the panels in spots approximately 5" square. Use a notched trowel to keep the cement 3/8" thick.
 5. Walk-in each panel to ensure complete contact with the membrane surface.
 6. Provide walk pads where indicated in Contract Drawings and at the following locations:
 - a. At base and top of fixed wall access ladders.
 - b. Around HVAC units.
 - c. At door access to roof areas and penthouse.
- K. Ponding Water: The ponding of any water on the roof surface after installation of the roofing system is not acceptable and will be grounds for rejection of the roof. Ponding is herein defined as precipitation remaining in a four square foot area or larger, 1/4 inch or deeper for a period of 24 hours from the termination of precipitation. Contractor shall not apply surface ply until verification of proper drainage has been determined. Contractor shall be responsible for modifications to roof system to ensure proper drainage including but not limited to reinstallation of roof system, installation of additional tapered insulation and/or installation of additional base plies.

3.4

CLEANING

- A. Remove all debris and excess material from the roof area. Pick-up all loose fasteners and sheet metal scraps.
- B. The Contractor shall clean off/remove excess adhesive, sealant, stains and residue on the membrane and flashing surfaces.

END OF SECTION 07 52 16