

**ADDENDUM NO. 1
TO
PROJECT MANUAL
PROJECT/CONTRACT NUMBER: 19-03
ROOFING PROJECT AT MAMMOTH HIGH SCHOOL
MAMMOTH UNIFIED SCHOOL DISTRICT**

This Addendum No. 1 to the Project Manual (“**Addendum**”) contains revisions and/or clarifications to the Contract for the above-referenced project. All work shown on the original Drawings and all applicable Sections of the original Project Manual shall be included in the Contract, except as herein modified.

All other provisions of the Project Manual shall remain in full force and effect and are reaffirmed. If there is any conflict between this Addendum and any provision of the Project Manual, the provisions of this Addendum shall control.

Acknowledgement of this Addendum shall be made in the appropriate section of the Bid Form. If acknowledgement is not made on the Bid Form the bid may be considered non-responsive.

I. Invitation to Bid

- A. Replace** Section 2 of the **Invitation to Bid** with the following: “Sealed Bids will be received until **2:00 PM, Friday, June 14, 2019**, at the District Office, located at **Mammoth Unified School District, PO Box 3509/461 Sierra Park Road, Mammoth Lakes, CA 93546**, at or after which time the bids will be opened and publicly read aloud. Any claim by a bidder of error in its bid must be made in compliance with section 5100 et seq. of the Public Contract Code. Any bid that is submitted after this time shall be non-responsive and returned to the bidder.”

- B. Replace** Section 3 of the **Invitation to Bid** with the following: “The Project consists of the installation of approximately 22,716 square feet of a new roofing system at Mammoth High School. Approved products and detailed scope are outlined in the bid documents.”

II. Bid Form. Replace the **Bid Form** with the attached **Amended Bid Form**, which revises the pricing requirements.

III. Contract. Replace **Exhibit A (“Scope of Work”)** to the **Contract for Repairs, Maintenance or Construction Projects** with the attached **Amended Exhibit A (“Scope of Work”)** to the **Contract for Repairs, Maintenance or Construction Projects**, which revises the Project description.

MAMMOTH UNIFIED SCHOOL DISTRICT

AMENDED
BID FORM

ROOFING PROJECT AT MAMMOTH HIGH SCHOOL

PROJECT: ROOFING PROJECT AT MAMMOTH HIGH SCHOOL ("Project" or "Contract")

- 1. **Base Bid.** Contractor will perform the Work defined in the Contract Documents and fully understands the scope of Work required in this bid and accepts in full payment for that Work the following total lump sum amount, all taxes included:

_____ Dollars \$ _____
Base Bid

Additive Alternate:

Alternate No. 1

_____ Dollars \$ _____
Amount of Alternate No. 1

Submission of Bidder's Bid signifies careful examination of the Contract Documents and a complete understanding of the nature, extent, and location of Work to be performed.

- 2. **Work.** Contractor has reviewed the Work outlined in the Contract Documents and fully understands the scope of Work required in this bid, understands the construction and project management function(s) is described in the Contract Documents.
- 3. **Schedule.** Contractor agrees to commence work under this Contract on the date established in the Contract Documents and to complete all work within the time specified in the Contract Documents.
- 4. **Subcontractors.** Contractor shall identify the **name, location** of the place of business, California Contractor State License Number, DIR Registration Number, and kind of work of each subcontractor that will perform work or labor or render service in or about the construction of the Work or improvement in an amount in excess of one-half of 1 percent (0.5%) of the Contractor's total bid. Use extra sheets/extra space as needed.

[Name]: [Location]: [CSLB Lic. #] and [DIR Reg. #]: [Kind of Work]:

- 5. **Bid Bond.** Contractor shall provide with its bid a certified or cashier's check or bidder's bond for an amount not less than ten percent (10%) of the bid amount. The certified or cashier's check or bid bond shall be made payable to the order of the District. If a bid bond accompanies the bid/proposal, the bond shall be secured by an admitted surety company, licensed in the State of California, satisfactory to the District and in the form attached hereto. The certified or cashier's check or bond shall be given as a guarantee that Contractor will enter into the Contract if awarded the Work, and in the case of refusal or failure to enter into the Contract, the District shall have the right to award to another bidder. If Contractor fails or refuses to timely enter into the contract, the District reserves the right to declare the bid bond forfeited and to pursue all other remedies in law or equity relating to such breach including, but not limited to, seeking recovery of damages for breach of contract. Failure to provide bid security, or bid security in the proper amount, will result in rejection of the bid.

6. **Noncollusion Declaration.** Contractor shall provide with its bid the Noncollusion Declaration in the form attached hereto.
7. **Iran Contracting Act Certification.** Contractor shall provide with its bid the Iran Contracting Act Certification in the form attached hereto.
8. **License.** Contractor certifies that it is, at the time of bidding, and shall be throughout the period of the Contract, licensed by the State of California to do the type of Work required under the terms of the Contract Documents. Contractor further certifies that it is regularly engaged in the general class and type of work called for in the Contract Documents.
9. **Approved Installer.** Contractor shall submit with this Bid written certification from the manufacturer that Contractor is approved to install the proposed roof system and provide a warranty. By summitting this bid, Contractor certifies that it specializes in applying bituminous built-up roofing system and is approved by the manufacturer of the proposed roof system.
10. **Prevailing Wages.** Pursuant to sections 1770 et seq. of the California Labor Code, Bidder and all Subcontractors under the Bidder shall pay all workers on all work performed pursuant to the Contract not less than the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work as determined by the Director of the State of California Department of Industrial Relations (DIR) for the type of work performed and the locality in which the work is to be performed within the boundaries of the District. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by the DIR are available from the District or on the internet (<http://www.dir.ca.gov>). In addition, if awarded a contract, Contractor shall comply with Labor Code § 1777.5 pertaining to prevailing wage compensation to apprentices for preemployment activities.
11. **Contractor Registration.** Bidder shall ensure that it and its Subcontractors comply with the registration and compliance monitoring provisions of Labor Code section 1771.4, including furnishing its CPRs to the Labor Commissioner, and are registered pursuant to Labor Code section 1725.5. Bidder and its subcontractors shall comply with Labor Code section 1725.5 to be qualified to bid, be listed in a bid or proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of the Contract.
12. **Addenda.** Addenda may also be issued to modify parts of the Contract Documents as deemed advisable by the District. Bidder must acknowledge each Addendum. Receipt and acceptance of the following addenda is hereby acknowledged.

No.: _____	Date: _____
No.: _____	Date: _____

1. **Erasures.** Bids shall be clearly written without erasure or deletions. District reserves the right to reject any Bid containing erasures or deletions.
2. **Words / Numerals.** Discrepancies between written words and figures, or words and numerals, will be resolved in favor of written words.
13. **Substitution for Specified Items.** Bids shall be based on products and systems specified in Contract Documents or listed by name in Addenda. All requests must comply with the requirements specified in the Special Conditions. **Request for Substitution Prior to Bid:** District must receive any request for substitution a minimum of **THREE (3)** business days prior to the date of bid opening and in accordance with requirements specified in the Special Conditions. **Request for Substitution after Bid Award:** Not permitted for this Project.
14. **Bid Protests.** Any bid protest by any Contractor regarding any other bid on this Project must be submitted in writing to the District, **at Mammoth Unified School District, Via mail, PO Box 3509, Mammoth Lakes, CA. 93546 or in person 461 Sierra Park Road, Mammoth Lakes, CA 93546**, before 2:00p.m. of the **SECOND (2ND)** business day following the date of bid opening, or the Contractor waives its right to protest. The protest must

contain a complete statement of any and all bases for the protest and the Contractor must concurrently transmit a copy of the protest to all other bidders that appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

15. **Bidder Responsibility.** Prior to the award of Contract, District reserves the right to consider the responsibility of the Bidder. District may conduct investigations as District deems necessary to assist in the evaluation of any bid and to establish the responsibility, including, without limitation, qualifications and financial ability of Bidders, proposed subcontractors, suppliers, and other persons and organizations to perform and furnish the Work in accordance with the Contract Documents to District's satisfaction within the prescribed time.
16. **Sealed Bids.** District will receive sealed Bids from Bidders as indicated in the Notice to Bidders and each Bidder shall ensure that its Bid is sealed and marked with name and address of the Bidder, the Project name and number, the bid number and bid package (if applicable), and the date for opening bids, all documents as required herein; and is submitted by date and time shown in the Notice to Bidders.
17. **Questions.** All questions about the meaning or intent of the Contract Documents are to be directed in writing to the District. Interpretations or clarifications considered necessary by the District in response to such questions will be issued in writing by Addenda faxed, mailed, or delivered to all parties recorded by the District as having received the Contract Documents. Questions received less than **SEVEN (7)** calendar days prior to the date for opening Bids may not be answered. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
18. **CONTRACT FORM. DISTRICT'S CONTRACT FORM IS PART OF THE CONTRACT DOCUMENTS. THE SCOPE OF THE PROJECT IS AS DESCRIBED IN EXHIBIT A TO THE CONTRACT. THE SUCCESSFUL CONTRACTOR SHALL, WITHIN SEVEN (7) CALENDAR DAYS OF NOTICE THAT IT HAS BEEN AWARDED THE CONTRACT, BE REQUIRED TO PROVIDE TO THE DISTRICT ALL CERTIFICATIONS, BONDS, INSURANCE DOCUMENTS, CONSTRUCTION SCHEDULE, SUBCONTRACTOR LIST AND ALL OTHER REQUIRED DOCUMENTATION AS INDICATED IN THE CONTRACT.**

Contractor hereby certifies to the District that all representations, certifications, and statements made by Contractor, as set forth in this bid form, are true and correct and are made under penalty of perjury.

Dated this _____ day of _____ 20 ____

Name of Contractor _____

Signed by _____

Title of Signer _____

Address of Contractor _____

Contractor's Taxpayer's Identification No. _____

Department of Industrial Relations (DIR) Registration No. of Contractor _____

Telephone Number _____ E-mail _____

Web page _____

Contractor's License No(s): No.: _____ Class: _____ Expiration Date: _____

No.: _____ Class: _____ Expiration Date: _____

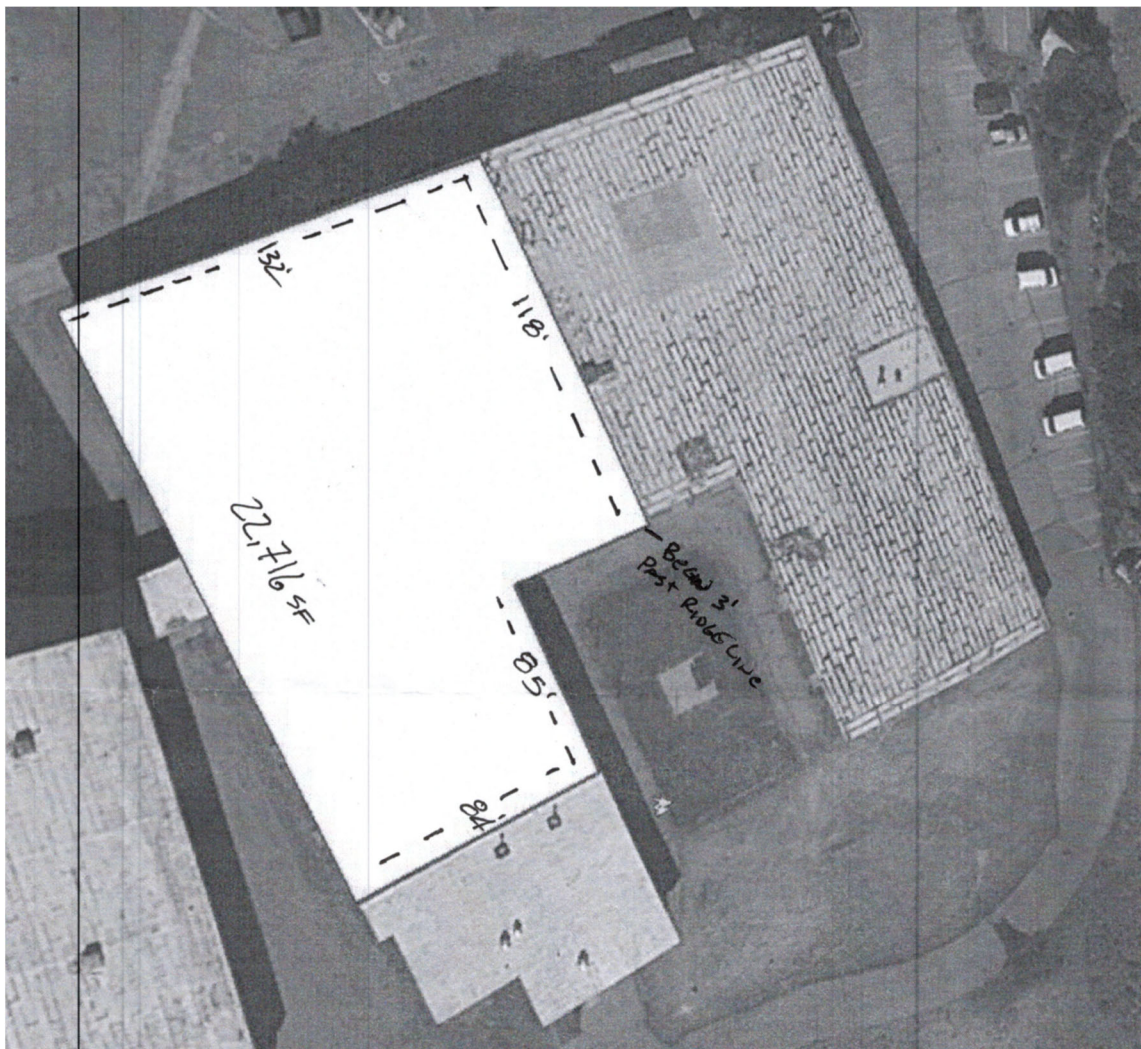
AMENDED
EXHIBIT A ("SCOPE OF WORK") TO THE
CONTRACT FOR REPAIRS, MAINTENANCE OR CONSTRUCTION PROJECTS

The Project consists of the installation of approximately 22,716 square feet of a new roofing system in the area of the Site as indicated in the picture below.

Base Bid: Contractor shall remove and dispose of existing roofing system and install a new roofing system. The New roofing system shall be: Sika Sarnafil SIKAPLAN Adhered Thereoplastic Polyvinyl-Chloride (PVC) 60 mil, or equal, white, pursuant to attached specification 07 54 20 attached hereto. Do not include the scope identified in Alternate No. 1 below.

Contractor shall install the roof and perform the Work pursuant manufacturer's standards and requirements, and must be in compliance with the National Roofing Contractors Association standards, conform to UL Roof Building Materials Directory for roof assembly fire hazard requirements for a minimum UL Class A, and meet all current applicable building codes.

Alternate No. 1: Contractor shall install Sarnafil G410, 60 Mil Feltback membrane adhered over 1/2" Dens Deck Prime mechanically fastened over the sloped plywood deck (or approved equal), pursuant to attached specification 07 54 20 attached hereto. Do not include the scope identified in Basic bid.



**SECTION 07 54 20
ADHERED FELTBACK
PVC THERMOPLASTIC MEMBRANE ROOFING**

PART 1 - GENERAL CONDITIONS

1.01 DESCRIPTION

Scope: To install an adhered Single Ply Thermoplastic (PVC) Roofing Membrane with flashings and other system components to comprise a roofing system for the Mammoth High School, MPR Building as follows:

Remove and dispose of the existing BUR materials down to the sloped plywood deck. Owner will not provide an abatement report. Contractor is required to take their own core sample to confirm the existing materials.

Install rigid R-30 insulation by mechanical attachment of the first layer to the plywood deck and adhered the subsequent layers using low-rise foam adhesive.

Adhered ¼" Dens Deck Prime to the insulation using low-rise foam adhesive.

Adhered Sarnafil G410, 60 Mil Feltback membrane over the Dens Deck board using water-based adhesive.

Remove and dispose of the existing edge metal and replace it with new clad edge metal in Copper Brown.

Flash each pipe penetration using asphaltic-resistant membrane.

Vent covers/ devices placed on curbs shall be removed and new flashing membrane shall be applied over top the curb. Vent covers/ devices shall be reattached to the curb. Ensure all curbs are properly secured to the structural deck; correct any securement deficiencies.

For those units that cannot be removed, waterproof the curb with flashing membrane and counter-flashing the termination using skirt metal.

Provide the owner with a unit price per lineal foot for new Crossgrip walk tread.

Related Work: The work includes but is not necessarily limited to the installation of:

- Substrate Preparation
- Wood Blocking
- Rigid Insulation
- Separation Board
- Roof Membrane
- Fasteners
- Termination Bars
- Adhesive for Flashings
- Roof Membrane Flashings
- Walkways
- Metal Flashings
- Sealants
- Clad Metal

Upon successful completion of work the following warranties must be provided:

- Manufacturer Warranty
- Roofing Contractor Warranty

QUALITY ASSURANCE

- A. Membrane Manufacturer must certify that the proposed equal has a membrane thickness equal to the membrane thickness specified, 60 mils thick, without ASTM (+/-) mil tolerances, as such tolerances are not acceptable. The felt backing shall not be included when measuring membrane thickness.
- B. Membrane must have at least twenty-seven (27) mils of waterproofing polymers above the reinforcement as documented in the Typical Physical Properties section of the Manufacturer's published Product Data Sheet for 60 mil membranes.

- C. Roofing Membrane Manufacturer must have a demonstrated performance history of producing thermoplastic membranes no less, in duration of years, than the warranty duration specified.
- D. Membrane Manufacturer must provide a list of at least 10 (ten) projects in which the submitted roofing material has been performing for the specified warranty duration. Membranes with modified formulation changes and undocumented proven performance will not be accepted.
- E. Membrane Manufacturer must not require the use of membrane cut edge sealant at any location. This is a maintenance item that the Owner does not accept.
- F. Manufacturer's warranty must have "No Dollar Limit" for the replacement of defective materials and labor with no exclusions for ponding water. Additionally, the warranty shall not obligate the owner to any maintenance requirements or schedule as a condition of the warranty.
- G. Membrane Manufacturer to confirm in writing that they directly manufacture the roofing membrane; private labeled membranes are not acceptable.
- H. Membrane Manufacturer must have an established program for recycling membrane at the end of its useful life. Must provide 3 (three) instances in which they have done so.
- I. Membrane Manufacturer must have recycled content certification from UL (Underwriters Laboratories) Environment.
- K. Upon completion of the installation and the delivery to the Manufacturer, by the Applicator of certification, that all work has been done in strict accordance with the contract specifications and Membrane Manufacturer's requirements, a Technical Service Representative will review the installed roof system.
- L. There is no deviation made from the project specification or the approved shop drawings without prior written approval by the Architect, the Owner's Representative and Roofing Manufacturer.
- M. The installer must have a minimum of 5 years' experience in installing roofing system of this type and nature. Contractor must be certified and approved by the roofing materials Manufacturer.
- N. All work pertaining to the installation of PVC membrane and flashings must only be completed by Applicator personnel trained and authorized by roofing Manufacturer in those procedures.

PART 2 -

SUBMITTALS

Submittals shall include the following:

1. Copies of Specification including physical properties.
2. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
3. Written approval by the insulation manufacturer (as applicable) for use and performance of the product in the proposed system.
4. Sample copy of Manufacturer's warranty including no exclusion for ponding water and no time limit shall be assigned to any such ponding water.
5. Sample copy of Applicator's warranty.
6. Dimensioned shop drawings which shall include:
 - a. Outline of roof with roof size and elevations shown.
 - b. Profile details of flashing methods for penetrations.
 - c. Technical acceptance from Manufacturer.
7. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and industry standards or practices and requirements of this specification as stated in Section 2.02, A-D and Quality Assurance, Section 1.02.
8. Certification from the membrane manufacturer that the membrane supplied contains at least 36 mils of waterproofing polymers and that the membrane thickness is a minimum of 60 mils,

- ASTM +/- tolerances do not apply.
9. Certification from the Applicator that the system specified meets all identified code and insurance requirements as required by the Specification.
 10. Letter from the proposed manufacturer confirming the number of years it has DIRECTLY manufactured the proposed roof system under the trade names and/or trademarks as proposed.
 11. Material Safety Data Sheets (MSDS)

CODE REQUIREMENTS

The applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.

Factory Mutual Research Corporation (FM) - Norwood, MA
Class 1-90

Underwriters Laboratories, Inc. - Northbrook, IL
Class A assembly

PRODUCT DELIVERY, STORAGE AND HANDLING

All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.

Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.

Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

All adhesives shall be stored at temperatures between 40° F (5° C) and 80° F (27° C).

All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.

All materials which are determined to be damaged by the Owner's Representative or the manufacturer are to be removed from the job site and replaced at no cost to the Owner.

JOB CONDITIONS

Membrane materials may be installed under certain adverse weather conditions but only after consultation with the Manufacturer, as installation time and system integrity may be affected.

Only as much of the new roofing as can be made weathertight each day, including all flashing and detail work, shall be installed. All seams shall be cleaned and heat welded before leaving the job site that day.

All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.

All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.

Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

The Applicator is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with the membranes. The Applicator shall consult the manufacturer regarding compatibility, precautions and recommendations.

Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the General Contractor/ Construction Manager/ Owner's Representative shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over Felt or plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

Prior to and during application, all dirt, debris and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods.

The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.

All roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.

All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Applicator and properly transported to a legal dumping area authorized to receive such material.

The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.

All rooftop contamination that is anticipated or that is occurring shall be reported to the manufacturer to determine the corrective steps to be taken.

The Applicator shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages in writing (letter copy to the manufacturer) to the Owner's Representative for corrective action prior to installation of the roof system.

Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction at the Owner's expense (letter copy to the manufacturer).

Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.

All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.

The Applicator shall conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.

The adhered membrane shall not be installed under the following conditions without consulting the manufacturer's technical department for precautionary steps:

The roof assembly permits interior air to pressurize the membrane underside.
Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
The wall/deck intersection permits air entry into the wall flashing area.

Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

Protective wear shall be worn when using solvents or adhesives or as required by job conditions.

BIDDING REQUIREMENTS

[RESERVED]

WARRANTIES

Manufacturer's System Warranty (only products purchased from the membrane manufacturer are covered under System Warranty): Upon successful completion of the work to the Roofing Manufacturer's and Owner's satisfaction, and receipt of final payment, the twenty (20) Year System Warranty shall be issued. The System Warranty shall provide for the roof membrane, all accessories that comprise a roof system, and contractor labor. The Warranty shall be Non-Prorated provide for No Dollar Limit (NDL), and shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the warranty period. Warranty shall not exclude foot traffic or storage of any kind upon the membrane surface. Warranty shall further not obligate the owner to a maintenance schedule or requirements of any kind as a condition of the warranty.

Applicator/Roofing Contractor Warranty: The Applicator shall supply the Owner with a separate two-year workmanship warranty. In the event any work related to roofing, flashing, or metal is found to be within the Applicator warranty term, defective or otherwise not in accordance with the Contract Documents, the Applicator shall repair that defect at no cost to the Owner. The Applicator's warranty obligation shall run directly to the Owner, and a copy shall be sent to the manufacturer.

Owner Responsibility: Owner shall notify both the manufacturer and the Applicator of any leaks as they occur during the time period when both warranties are in effect.

PRODUCTS

GENERAL

- A. The components of the Adhered roof system are to be products of the membrane manufacturer as indicated on the Detail Drawings and specified in the Contract Documents.
- B. Components to be used that are other than those supplied or manufactured by the membrane manufacturer may be submitted for review and acceptance by the manufacturer. The manufacturer's acceptance of any other product is only for a determination of compatibility with membrane products and not for inclusion in the manufacturer's warranty. The specifications, installation instructions, limitations, and/or restrictions of the respective manufacturers must be reviewed by the Owner's Representative for acceptability for the intended use with the manufacturer's products.

2.01 MEMBRANE

- A. Sarnafil® G410-18 Feltback fiberglass reinforced membrane with a factory-applied integral lacquer coating to repel dirt and sustain reflectivity, or equal. Contact Keith Steiger, (760) 617-4404.

Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.

Sarnafil G410-15 feltback, 60 mil (1.5 mm), thermoplastic membrane with fiberglass reinforcement and a factory applied 9 oz. geotextile felt backing, or equal.

Color of Membrane:

EnergySmart feltback (White), initial reflectivity of 0.83, initial emissivity 0.92, solar reflective index (SRI) of >104.

Typical Physical Properties

<u>Parameters</u>	<u>ASTM Test Method</u>	<u>Minimum ASTM Requirement</u>
Reinforcing Material	-	
Overall Thickness, min., inches (mm)	D638	0.060 (1.15)
Tensile Strength, min., psi (MPa)	D638	1500 (10.4)
Elongation at Break, min. (machine x tranverse)	D638	250% / 230%
Seam strength*, min. (% of tensile strength)	D638	75
Retention of Properties After Heat Aging	D3045	-
Tensile Strength, min., (% of original)	D638	90
Elongation, min., (% of original)	D638	90
Tearing Resistance, min., lbf (N)	D1004	10 (45.0)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass
Accelerated Weathering Test (Xenon Arc)	D2565	5,000 Hours
Cracking (7x magnification)	-	None
Discoloration (by observation)	-	Negligible
Crazing (7 x magnification)	-	None
Linear Dimensional Change	D1204	0.10 %
Weight Change After Immersion in Water	D570	± 3.0%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass
Initial Solar Reflectance	E903	- 0.83
Emissivity	E408, C1371,	- 0.90
Solar Reflective Index (SRI)	E1980	- 104
Recycled Content (5 & 10 ft. sheets only)	8 to 12% Pre-Consumer / Up to 1% Post Consumer.	

*Failure occurs through membrane rupture not seam failure.

FLASHING MATERIALS

A. Wall/Curb Flashing

Flashing Membrane: A fiberglass reinforced membrane adhered to approved substrate using adhesive. Consult Product Data Sheets for adhesive options and additional information.

PVC Clad Metal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad is a 25 gauge, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported membrane laminated on one side.

B. Perimeter Edge Metal or Coping Metal

1. Sarnaclad, or equal: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 24 gauge, G90 galvanized metal sheet with a 20 mil (0.5 mm) unsupported Sarnafil membrane laminated on one side. Color shall be Copper Brown by Sarnafil, or equal.

Miscellaneous Flashing

Flash: A prefabricated expansion joint cover made from membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of new and existing expansion gaps from 1 inch to 4½ inches (25 mm to 114 mm) across.

Reglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Reglet is produced from 6063-T5, 0.10 inch - 0.12 inch (2.5 mm - 3.0 mm) thick extruded aluminum. Reglet has a 2¼ inch (57 mm) deep profile, and is provided in 10 foot (3 m) lengths. Use prefabricated Reglet mitered inside and outside corners where walls intersect.

Stack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick G410 membrane.

Circle-"G": Circular 0.048 inch (48 mil/1.2 mm) thick G410 membrane patch welded over T-joints formed by overlapping thick membranes.

Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Clad base flashings.

Multi-Purpose Sealant: A sealant used at flashing terminations.

StaBond Adhesive, or equal: A solvent-based reactivating-type adhesive used to attach membrane to flashing substrate.

Low-Rise Foam Adhesive: A two-component polyurethane, low rise expanding foam adhesive used to attach membrane to flashing substrate.

Felt: A non-woven polyester or polypropylene mat cushion layer that is necessary behind G410 or G459 Flashing Membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.

INSULATION AND SEPARATION BOARD

A. Insulation: A rigid isocyanurate foam insulation with black mat facers. Insulation is available in 4 ft x 4 ft (1.2 m x 1.2 m) or 4 ft x 8 ft (1.2 m x 2.4 m) sizes and various thicknesses. Insulation shall provide for R-30.

Dens-Deck®, or equal A siliconized gypsum, fire-tested hardboard with glass-mat facers. Dens-Deck is provided in a 4 ft x 8 ft (1.2 m x 2.4 m) board size and in thicknesses of ¼" for application on this project.

ATTACHMENT COMPONENTS

A. Membrane Adhesive:

1. 2121 Adhesive: A water-based adhesive used to attach the membrane to horizontal or near-horizontal substrates. Application rates are as follows:

APPLICATION RATES FOR FELTBACK MEMBRANE				
	Adhesive Rates – Gallons/100 Ft ² (<i>Liters/Meter²</i>)			Approximate <u>Sq. Ft./Pail</u> (<i>meter²</i>)
	Substrate	Membrane	Total	
GP Dens-Deck Prime®, or equal	1.50 (0.61)	+	0 = 1.50 (0.61)	333 (30.94)

Notes:

- a) There is a significant increase in drying time due to an increase in humidity and/or a decrease in temperature. Do not install when outdoor or substrate temperatures during drying period are expected to fall below 40° F (5° C).

Do not allow 2121 adhesive to skin-over or surface-dry prior to installation of membrane. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.

B. Insulation Board Adhesive

1. Low Rise Foam Adhesive: A two component (Part A and B) polyurethane low-rise adhesive for bonding insulation to approved compatible substrates. Consult Product Data Sheets for additional information. Application rates are as follows:

APPLICATION RATES FOR INSULATION		
	Approximate Sq. Ft. (<i>Meter²</i>) per Drum Set	
	50 Gal. (189.27 liter) Set	15 Gal. (56.78 liter) Set
Wood	8,500 - 9,000 (789.68 - 836.13)	2,500 - 2,700 (232.26 - 250.84)
Isocyanurate facer	8,500 - 9,000 (789.68 - 836.13)	2,500 - 2,700 (232.26 - 250.84)

Notes:

- a) Adhesive must be applied as a continuous layer.
- b) Use a water-filled, foam-covered lawn roller to consistently and evenly press insulation into adhesive layer.

- c) Storage temperatures in excess of 90° F (32° C) may affect shelf life.
- d) If exposed to temperatures below 40° F (5° C), restored to a minimum temperature of 60°F (15° C) before use.
- e) Job site conditions may affect performance. LR-2001 adhesive shall not be used if surface and/or ambient temperatures below 40° F (5° C) are expected during application or subsequent curing time.
- f) The addition of LR-2001 Catalyst to Part B may be required when temperatures are between 40° F (5° C) and 80° F (27° C).
- g) Adhesive shall not be applied to wet or damp surfaces.

C. Plate: Used with various Fasteners to attach insulation boards to roof deck. Plate is a 3 inch (75 mm) square or round, 26 gauge stamping of SAE 1010 steel with an AZ 55 Galvalume coating.

Plate-HD/CD: Used with Fastener-HD or Fastener-CD10 to attach insulation boards to wood or concrete roof decks. Plate-HD/CD is a 3 inch (75 mm) round stamping of SAE 1010 steel with an AZ 55 Galvalume coating.

Fastener No. 12: Number 12 corrosion-resistant fastener used with Plates to attach insulation boards to steel or wood roof decks. Fastener No. 12 has a modified buttress thread, a shank diameter of approximately 0.168 inch (4 mm) and a thread diameter of approximately 0.214 inch (5 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

Fastener-HD: A #14 corrosion-resistant fastener used with Plate-HD/CD to attach insulation boards or with Disc and Bar to attach membrane to structural concrete or wood roof decks. Fastener-HD has a shank diameter of 0.190 inch (4.8 mm), a thread diameter of 0.245 inch (6.2 mm) and a #3 Phillips drive head with a diameter of 0.435 inch (11 mm).

Fastener-XP: A #15, heavy-duty, corrosion-resistant fastener used with Plate to attach insulation or Stop and Bar to attach G410 roof membrane to steel or wood roof decks. Fastener-XP has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

Fastener-XPS: A specially designed, heavy-duty, corrosion-resistant fastener used with Stop or Bar to attach G410 roof membrane to steel roof decks. Fastener-XPS has a shank diameter of approximately 0.21 inch (5.3mm) and a thread diameter of approximately 0.26 inch (6.6). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement and simplicity of application.

Fastener-CD10: A nail-in, corrosion-resistant fastener used with Plate-HD/CD, Stop or Bar to attach insulation or membrane to normal weight concrete roof deck. Fastener-CD10 has a shank diameter of 0.215 inch (5.5 mm), a split diameter of 0.265/0.275 inch (6.7/7.0 mm) and a flat head with a 0.435 inch (11 mm) diameter.

Stop: An extruded aluminum, low profile bar used with certain Fasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Stop is a 1 inch (25 mm) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes every 6 inches (152 mm) on center.

Termination Bar: An FM-approved, heavy-duty, 14 gauge, galvanized or stainless, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch (25 mm) on center to allow various Fastener spacing options.

Cord: A 5/32 inch (4 mm) diameter, red-colored, flexible thermoplastic extrusion that is welded to the top surface of the membrane and against the side of the Bar, used to hold the membrane in position.

WALKWAY PROTECTION

A. Crossgrip, or equal: A rolled-out walkway protection mat used to protect Sarnafil roofing membrane

from mechanical abuse. Crossgrip Walkway is 9/16 inch (14 mm) thick flexible pvc with a heavily textured surface. Crossgrip Walkway is loose laid on top of completed Sarnafil roof assemblies. Where design windspeeds exceed 94 mph (150 km/h) the walkway must be secured with loops of Sarnafil membrane welded to the field sheet.

MISCELLANEOUS ACCESSORIES

- A. Aluminum Tape: A 2 inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at Clad joints.

Sealing Tape Strip: Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.

Multi-Purpose Tape: A high performance sealant tape with used with metal flashings as a preventive measure against air and wind blown moisture entry.

Seam Welder 641mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of membrane seams.

Perimat Welder: 120 volt, self-propelled, hot-air welding machine used to seal long-lengths of membrane seams along perimeter details.

Solvent: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Solvent is also used daily to clean seam areas prior to hot-air welding in tear off or dirty conditions or if the membrane is not welded the same day it is unrolled.

MISCELLANEOUS FASTENERS AND ANCHORS

- A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1¼ inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

RELATED MATERIALS

- A. Wood Nailer: Treated wood nailers shall be installed at the perimeter of the entire roof and around such other roof projections and penetrations as specified on Project Drawings. Thickness of nailers must match the insulation thickness to achieve a smooth transition. Wood nailers shall be treated for fire and rot resistance (wolmanized or osmose treated) and be #2 quality or better lumber. Creosote or asphalt-treated wood is not acceptable. Wood nailers shall conform to Factory Mutual Loss Prevention Data Sheet 1-49. All wood shall have a maximum moisture content of 19% by weight on a dry-weight basis.

EXECUTION

PRE-CONSTRUCTION CONFERENCE

- A. The Applicator, Owner's Representative/Designer and Manufacturer(s) shall attend a pre-construction conference.

The meeting shall discuss all aspects of the project including but not limited to:

- Safety
- Set up
- Construction schedule
- Contract conditions
- Coordination of the work

SUBSTRATE CONDITION

- A. Applicator shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.

Applicator shall verify that the work done under related sections meets the following conditions:

- Roof drains and/or scuppers have been reconditioned and/or replaced and installed properly.
- Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
- All surfaces are smooth and free of dirt, debris and incompatible materials.
- All roof surfaces shall be free of water, ice and snow.

SUBSTRATE PREPARATION

The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight. The Owner's Representative shall ensure that the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.

- A. Re-roofing with Removal of Existing Bitumen Roofing: All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weathertight with new materials during a one-day period or before the onset of inclement weather

SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Adhered roof system.

The Applicator shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.

The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.

All roof surfaces shall be free of water, ice and snow.

The membrane shall be applied over compatible and accepted substrates only.

WOOD NAILER INSTALLATION

- A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Detail Drawings.

Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall meet this requirement and that of the current Factory Mutual Loss Prevention Data Sheet 1-49.

Thickness shall be as required to match substrate or insulation height to allow a smooth transition.

Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.

INSULATION AND SEPARATION BOARD INSTALLATION

- A. Insulation and separation board shall be installed according to insulation manufacturer's instructions.

Insulation and separation board shall be neatly cut to fit around penetrations and projections.

Install tapered insulation in accordance with insulation manufacturer's shop drawings.

Install tapered insulation around drains creating a drain sump.

Do not install more insulation board than can be covered with the membrane by the end of the day or the onset of inclement weather.

Use at least 2 layers of insulation when the total insulation thickness exceeds 2½ inches (64 mm). Stagger joints at least 12 inches (0.3 m) between layers.

Mechanical Attachment

Insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate according to the insulation manufacturer's, FM's and the manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation boards to rest evenly on the roof deck/substrate so that there are no significant and avoidable air spaces between the boards and the substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.

Fasteners are to be installed consistently in accordance with fastener manufacturer's recommendations. Fasteners are to have minimum penetration into structural deck recommended by the fastener manufacturer and the membrane manufacturer.

Use fastener tools with a depth locator and torque-limiting attachment as recommended or supplied by fastener manufacturer to ensure proper installation.

H. Low Rise Foam Adhesive

1. Apply using pneumatic spray equipment over properly installed and prepared substrates at a rate according to the manufacturer's requirements. Low Rise Foam Primer may be required prior to application of adhesive if excessive dirt or dust remains on substrate. Contact manufacturer's Technical Department for specific primer requirements. Apply adhesive in a smooth, even coating with no gaps, globs, puddles or similar inconsistencies. Only areas that can be made completely watertight in the same day's operations shall be coated.
2. Allow adhesive to rise up approximately 1/8 inch and set insulation boards into adhesive. Continue to install boards into adhesive. After set up time has been reached (approx. 5 to 10 minutes, will vary based on temperature and amount of catalyst added) walk insulation boards into adhesive to ensure full embedment. CAUTION: Walking insulation boards in immediately after placement into adhesive may cause slippage/movement until adhesive starts to set up. On roof slopes greater than ½ inch in 12 inches, begin adhering insulation at low point and work upward to avoid slippage. One person should be designated to walk in, trim/slit and apply weight to all insulation boards to ensure adequate securement. For multiple layers of insulation spray adhesive over the base layer once fully secured and follow procedures above for attachment of each insulation layer.
3. Installation Guidelines:
 - a) Adhesive must be applied as a continuous layer.
 - b) Storage temperatures in excess of 90° F (32° C) may affect shelf life of adhesive.
 - c) If exposed to temperatures below 40° F (5° C), restored adhesive to a minimum temperature of 60° F (15° C) before use.
 - d) Job site conditions may affect performance. Low Rise Foam adhesive shall not be used if surface and/or ambient temperatures below 40° F (5° C) are expected during application or subsequent curing time.
 - e) The addition of Low Rise Foam Catalyst to Part B may be required when temperatures are between 40° F (5° C) and 80° F (27° C). Refer to table below

- for approximate amount of catalyst to be added.
- f) Adhesive shall not be applied to wet or damp surfaces.

INSTALLATION OF ROOF MEMBRANE

The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.

A. 2121 Adhesive:

1. Over the properly installed and prepared substrate, 2121 adhesive shall be poured out of the pail and spread using notched ¼ inch x ¼ inch x ¼ inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to the manufacturer's requirements. No adhesive is applied to the back of the G410 feltback membrane. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
2. The G410 feltback roof membrane is unrolled immediately into the wet 2121 adhesive. Adjacent rolls overlap previous rolls by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly into place with a water-filled, foam-covered lawn roller by frequent rolling in two directions. **Do not allow adhesive to skin-over or surface-dry prior to installation of G410 feltback membrane.**
3. Weld G410 coverstrips at all G410 feltback seams that do not have a factory selvage edge.

Notes:

- a) 2121 adhesive shall not be used if temperatures below 40° F (5° C) are expected during application or subsequent drying time.
- No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

B. Membrane Installation:

1. Position and unroll successive sheets of feltback membrane and align to provide a minimum 3 inch (76 mm) wide overlap.
2. Fold adjacent sheet in half lengthwise to expose substrate area. Fold selvage Sheet edges (along the length of the sheets) under the membrane to prevent overspray onto weld area. Adhere membrane that will be bottom side of the weld first. This will protect the selvage edge from being contaminated by setting into Low Rise Foam adhesive.
3. Spray Low Rise Foam adhesive onto the substrate and allow to rise approximately 1/8 inch (45.7 cm).
4. Place membrane into Low Rise Foam adhesive and roll with water filled, foam covered lawn roller to set into adhesive.
5. Fold remaining sheets lengthwise to expose additional substrate area adjacent to area previously adhered.
6. Apply Low Rise Foam adhesive to substrate and continue process described above until all sheets are adhered.
7. Hot-air weld all seams.

HOT-AIR WELDING OF SEAM OVERLAPS

A. General

All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.

Welding equipment shall be provided by or approved by the manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Technical Representative prior to welding.

All membrane to be welded shall be clean and dry.

Hand-Welding: Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be

allowed to warm up for at least one minute prior to welding.

The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.

The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow," the hand roller is positioned perpendicular to the nozzle and pressed lightly. For straight seams, the 1½ inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the ¾ inch (20 mm) wide nozzle shall be used.

Machine Welding

Machine welded seams are achieved by the use of automatic welding equipment. When using this equipment, the manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated off the generator.

Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.

Quality Control of Welded Seams

The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark grey material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator to locations as directed by the Owner's Representative or a manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

MEMBRANE FLASHINGS

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

A. Adhesive for Membrane Flashings

Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.

No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

Install Stop/Bar/Cord according to the Detail Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs. Stop is required by the manufacturer at the base of all tapered edge strips and at transitions, peaks, and valleys according to the manufacturer's details.

The manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by the manufacturer prior to installation.

All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Owner's Representative and the Technical Department.

All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and

miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the membrane.

All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Stop at 6-8 inches (0.15-0.20 m) on center.

Flashings shall be terminated according to the manufacturer's recommended details.

All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement.

METAL FLASHINGS

A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:

Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).

Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - latest issue.

Metal, other than that provided by the manufacturer, is not covered under the warranty.

Complete all metal work in conjunction with roofing and flashings so that a watertight condition exists daily.

Metal shall be installed to provide adequate resistance to bending to allow for normal thermal expansion and contraction.

Metal joints shall be watertight.

Metal flashings shall be securely fastened into solid wood blocking. Fasteners shall penetrate the wood nailer a minimum of 1 inch (25 mm).

Airtight and continuous metal hook strips are required behind metal fascias. Hook strips are to be fastened 12 inches (0.3 m) on center into the wood nailer or masonry wall.

Counter flashings shall overlap base flashings at least 4 inches (100 mm).

Hook strips shall extend past wood nailers over wall surfaces by 1½ inch (38 mm) minimum and shall be securely sealed from air entry.

CLAD METAL BASE FLASHINGS/EDGE METAL

All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Owner's Representative and the manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.

A. Clad metal flashings shall be formed and installed per the Detail Drawings.

All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).

Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.

Adjacent sheets of Clad shall be spaced ¼ inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint.

Flashing membrane shall be applied over the top of the wood nailer before installing the edge/ coping clad metal.

WALKWAY INSTALLATION

- A. Crossgrip Walkway: Crossgrip Walkway is installed loose laid on top of completed Sarnafil roof assemblies. Where design windspeeds exceed 94 mph (150 km/h) the walkway must be secured with loops of Sarnafil membrane welded to the field sheet. Unroll and position Crossgrip Walkway within specified areas and cut to desired length. Do not install Crossgrip Walkway directly over Sarnabars. Connecting clips are available for butting two ends together. **Important:** Check all existing deck membrane seams that are to be covered and re-weld any inconsistencies before installation.

TEMPORARY CUT-OFF

- A. All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100% watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant as described in Section 2.10. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.
- B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

COMPLETION

- A. Prior to demobilization from the site, the work shall be reviewed by the Owner's Representative and the Applicator. All defects noted and non-compliances with the Specifications or the recommendations of the manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Applicator to the satisfaction of the Owner's Representative and the manufacturer prior to demobilization.
- B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

END OF SECTION