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SECTION 07533 - SINGLE PLY ROOFING MEMBRANE

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section includes fully adhered elastomeric sheet membrane roofing system installed directly to internally insulated concrete deck over corrugated metal decking, complete with base and coated metal flashings, scuppers, and other work required to make a complete waterproof installation.
- B. Related Work: The work includes but is not necessarily limited to the installation of:
  - 1. Vapor Retarder
  - 2. Wood Blocking
  - 3. Insulation
  - 4. Separation Layers
  - 5. Adhesive
  - 6. Fasteners
  - 7. Roof Membrane
  - 8. Roof Membrane Flashings
  - 9. Walkways
  - 10. Metal Flashings
  - 11. Sealants
  - 12. Removal of Existing Roofing Insulation
  - 13. Substrate Preparation
  - 14. Roof Drains
- C. Related Sections:
  - 1. 03300 - Cast-In-Place Concrete
  - 2. 03525 - Lightweight Insulating Concrete
  - 3. 05300 - Metal Decking
  - 4. 06100 - Rough Carpentry
  - 5. 07620 - Flashing and Sheet Metal
  - 6. Division 15 - Mechanical: Roof penetration items.
  - 7. Division 16 - Electrical: Roof penetration items.

1.01 REFERENCES

- A. Comply with specified requirements of the following:
  - 1. ASTM D570: Water Absorption of Plastics
  - 2. ASTM D638: Tensile Properties of Plastics
  - 3. ASTM D751: Coated Fabrics

4. ASTM D1004: Initial Tear Resistance of Plastic Film and Sheeting
5. ASTM D2136: Coated Fabrics - Low Temperature Bend Test
6. ASTM E84: Surface Burning Characteristics of Building Materials
7. ASTM E96: Water Vapor Transmission of Materials
8. ASTM E108: Fire Tests of Roof Coverings
9. FS HH-I-1972/GEN: Insulation Board, Thermal, Faced, Polyurethane or Polyisocyanurate

1.02 SYSTEM DESCRIPTION

- A. Fully adhered single ply roofing system installed over lightweight insulation concrete.
- B. Elastomeric sheet membrane roof assembly to conform to ASTM E108 (UL-790 requirements for Class A) and FM requirements for a Class I rated assembly, and I-90 requirements for uplift resistance, and in accordance with all applicable codes.

1.03 QUALITY ASSURANCE

- A. Membrane Manufacturer: Company specializing in the manufacture of elastomeric sheet roof membranes, with ten years minimum satisfactory experience.
- B. Roofing Applicator: Company specializing in installation of thermoplastic sheet roof membranes with 3 years documented satisfactory experience, completing at least five projects of similar size and complexity, approved and certified by membrane manufacturer.
- C. Provide certified test results performed by an independent testing authority attesting that membrane performance meets or exceeds the specified requirements.
- D. Schedule and administer pre-roofing conference to review roof insulation and roofing system application, compatibility, scheduling, interface, coordination, warranty, and quality standards with Owner's and Resident's representatives, roofing applicator's representatives, job superintendent, manufacturer's representative and material suppliers. Record and distribute minutes of the pre-roofing conference to attendees and others responsible for related work. Satisfactory acceptance of the minutes of the pre-roofing conference minutes by all will be required before acceptance of the method and sequence of application of the insulation and the elastomeric sheet membrane roofing, can be implemented.
- E. Bidders shall visit the site and carefully examine the areas in question as to conditions, which may affect proper execution of the work. All dimensions and quantities shall be determined or verified by the contractor. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions unless agreed to in advance with the Owner or Resident.
- F. Comply with all applicable requirements of EPA, OSHA and the State of Maine.

#### 1.04 REGULATORY REQUIREMENTS

- A. The applicator shall submit evidence that the proposed roof system meets the requirements of the local and all other applicable building codes 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.
1. Underwriters Laboratories, Inc. (UL-790): Class A Fire Hazard Classification (ASTM E108).
  2. Factory Mutual Engineering Corporation (FM): Roof assembly classification, FM Construction Bulletin 1-28, Class 1 Classification.
  3. BOCA Building Code, Latest Edition.

#### 1.06 SUBMITTALS

- A. Shop Drawings: Detail special joint or termination conditions and conditions of interface with other materials, including expansion joints.
1. Submit shop drawings or catalog cuts in such form as to completely cover scope of each different roof system and flashing detail required, whether indicated in the contract documents or not, including, but not limited to:
    - a. Membrane sheet roofing, with base flashing.
    - b. Field dimensioned layout of entire roof areas with size and location of each item of equipment roof penetrations, expansion joints, and extent of traffic surfacing.
    - c. Roof insulation, giving roof slopes and thickness.
    - d. Accessories.
    - e. Fasteners and fastening patterns for insulation.
    - f. Interface coordination with substrates, wood nailers, blocking, curbing, equipment supports, equipment curbs, roof scuppers and penetrations.
- B. Product data for sheet membrane, elastic flashing, expansion joint tube, joint sealants, with temperature range for application of membrane and published installation instructions for standard catalog items.
- C. Samples of elastomeric sheet membrane roofing with internal and external corners, seam jointing, attachment method, sealing and counterflashing cover, control and expansion joints, and 2 samples of each type of fastener and fastener assembly.
- D. Certificates: Submit roofing system materials manufacturer certificates as follows:
1. That all materials meet or exceed specified requirements.
  2. Approval of the roofing applicator.

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- 3. That adjacent materials, including insulation, have been tested and found to be compatible with the roofing system.
- E. Sample copies of applicator and manufacturer's warranties for review.
- 1.07 DELIVERY, STORAGE AND HANDLING
- A. Store products within manufacturer's recommended temperature range in weather protected environment clear of ground and moisture on proper dunnage. Protect foam insulation from direct sunlight exposure. Protect completed work from physical damage and staining by other work and the elements until time of contract completion date, in accordance with manufacturer's published instructions.
  - B. Distribute the weight of materials stored on the roof decks in such a manner as to preclude damage to deck or structure by not exceeding the design loads and by storing only enough materials at any one time, to allow continuity of roofing application.
  - 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.
- 1.08 ENVIRONMENTAL REQUIREMENTS
- A. Do not apply membrane during inclement weather or when air temperature is or may fall below 40°F.
  - B. Do not apply roofing membrane to damp or frozen deck surface.
  - C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.
- 1.09 JOB CONDITIONS
- A. Some materials may be installed under certain adverse weather conditions but only after consultation with the roofing membrane manufacturer, as installation time and system integrity may be affected.
  - B. 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.
  - C. 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.

- D. 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.
- E. 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.
- F. 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.
- G. 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 membranes. The Applicator shall consult the membrane manufacturer regarding compatibility.
- H. 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 Applicator 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 Sarnafelt or plywood over insulation board shall be provided for all new and existing roof areas which receive rooftop traffic during construction.
- I. 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.
- J. The Applicator shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- K. 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.
- L. 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.
- M. The Applicator shall take precautions that storage and/or application of materials and/or equipment does not overload the roof deck or building structure.

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- N. Installation of the membrane over coal tar pitch or a resaturated roof requires special consideration to protect the membrane from volatile fumes and materials. Consult the membrane manufacturer for precautions prior to bid.
  - O. All rooftop contamination that is anticipated or that is occurring shall be reported to the membrane manufacturer to determine the corrective steps to be taken.
  - P. 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 to the Owner's Representative for corrective action prior to installation of the roof system.
  - Q. Applicator shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner's Representative of such condition in writing for correction.
  - R. Site cleanup, including both interior and exterior building areas which have been affected by construction, shall be completed to the Owner's satisfaction.
  - S. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.
  - T. 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.
  - U. The adhered membrane shall not be installed under the following conditions without consulting the membrane manufacturer for precautionary steps:
    - 1. The roof assembly permits interior air to pressurize the membrane underside.
    - 2. Any exterior wall has 10% or more of the surface area comprised of opening doors or windows.
    - 3. The wall/deck intersection permits air entry into the wall flashing area.
  - V. Precautions shall be taken when using Sarnacol 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.
  - W. Protective wear shall be worn when using solvents or adhesive or as required by job conditions.
- 1.10 WARRANTY
- A. Provide 5 year roofing applicator's full maintenance guaranty for defective material and labor.

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- B. Provide 15 year manufacturer's full unconditional warranty for defective materials and labor replacement.
- C. Warranty: The roofing applicator, prior to final acceptance, shall furnish warranty agreements to the Owner, to include coverage of materials and installation and resultant damage resulting from failure to resist penetration of moisture, as follows:
1. Roofing applicator's warranty severally and jointly co-signed by the roofing applicator's surety on roofing and flashings including both elastomeric membrane and elastomeric coated metal for a 5-year period starting from the contract completion date.
  2. Manufacturer's warranty (no limits on liability) for a 15 year period against failure of elastomeric roofing (materials and workmanship), base flashing, connections and bond between elastomeric sheet roofing, with edge flashings, expansion joints, roof penetrations, and roof penetration curbs. If the roofing fails to perform as warrantied, the manufacturer shall at his own expense make or cause to be made such modifications or repairs to the roof in the manner and to the extent, to enable said roofing to perform as warrantied. Only exclusions to this warranty will be those recognized industry-wide, like damage from natural disasters, abnormal use or abuse of the roof, structural failures, vandalism, Owner's failure to obtain written approval from the manufacturer prior to placing, relocating or constructing any device or structure on or through the roof membrane or modifying the roof membrane after final acceptance of the project, excluding Owner's emergency repairs made by the Owner's maintenance personnel who have been factory or site trained and certified by the roofing manufacturer.
  3. The 5 year roofing applicator's full maintenance warranty and the 15 year manufacturer's full unconditional warranty are to supplement each other in such fashion that the Owner is continuously and fully protected for the 15 year period on both materials and labor, including all incidental related and required items to hold the Owner from additional cost due to penetration of moisture and the repair or maintenance caused by leaks.

## **PART 2 PRODUCTS**

### **2.01 SYSTEM MANUFACTURERS**

- A. In order to establish a unified and coordinated systems, a uniform standard of quality, a single source of materials to ensure production of an integrated system, and maintain the capability of a complete system warranty, the specifications are based on a system produced by Sarnafil Inc., Canton, MA, without intent to restrict other manufacturers from providing an equivalent installation.
1. Equivalent complete roofing systems, including insulation board, will be considered for approval in accordance with the provisions of General Conditions.

2. Only fully integrated and complete systems will be considered to preserve the qualities specified above.

## 2.02 SINGLE PLY ROOFING MEMBRANE

### A. Membrane:

1. Sarnafil® G410 Feltback fiberglass reinforced membrane with a lacquer coating.
2. Membrane shall conform to ASTM D4434-96 (or latest revision), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.
3. As manufactured, membrane shall conform to the following physical properties:
  - a. Color to be selected by the Resident
  - b. Thickness to be 60 mil

## 2.03 FASTENERS

- A. For fastening membrane to metal or concrete deck use membrane manufacturer's approved fasteners.
- B. Mechanical Fasteners for Securing Roof Membrane Galvanized Steel Strips to Metal Roof Decks and Wood Nailers: Electro-galvanized self-drilling self-tapping screws recommended and listed by roofing manufacturer to meet specified uplift requirements, but not less than 400 lb. pullout strength, minimum length sufficient to penetrate 1/2 inch through the steel deck.
- C. Nails for Securing Sheet Metal Flashings to Wood Nailers: Slater head, No. 11 gage by 1 inch minimum length, annular ring shanked nails of double hot dip galvanized steel or stainless steel.
- D. Miscellaneous Fasteners and Anchors: 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 1-1/4 inch (32mm) 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.

## 2.04 HOSE CLAMPS

- A. Standard automotive type stainless steel hose clamp with screw adjustment, sized to suit pipe and conduit sizes.



## 2.05 FLASHING MATERIALS

### A. Sheet Metal Flashings

1. Provide polymer coated sheet metal of coating type and color to match roofing used.
2. Emergency Overflow Scupper Flashings: Fabricate of coated sheet metal to closely fit inside scupper openings in parapets, based on field dimensions after scupper openings are made. Extend sheet metal approximately 4 inches out on roof, each side and top of opening; through parapets into concrete scuppers or projecting approximately 1 inch on exterior with hemmed edge and bottom drip.
3. Sealant Filled Pitch Pans for Items Penetrating Roof: Approximately 3" high, with 3" minimum clearance, with 4" roof flanges and hemmed top.
4. Parapet Cap Flashings (Exposed): Fabricate in 8' sections with 4" wide flange on inner edge with hemmed bottom edge and with outer fascia extended 3/4" minimum below bottom of wood nailers then terminated in a hook. Provide continuous stainless steel cleats to retain outer edge. Shop punch cleats for fastenings at 6 inches o.c. maximum.
6. Roof Edge Fascia and Drip Strip Flashings: Fabricate as indicated, using coated sheet steel in not over 8 foot sections, with minimum 4 inch wide roof flanges, with 1/4 inch high raised edges on approximately 4 inch high fascias, with bottom edge extended not less than 3/4 inch below wood nailer, bottom drip formed and hooked over continuous sheet metal cleats to retain bottom edges. Provide 18 gage galvanized sheet metal cleats. Shop punch cleats at 6 inches o.c. for fastenings.

### B. Wall/Curb Flashing

1. Sarnafil G410 Membrane: A fiberglass reinforced membrane adhered to approved substrate using Sarnacol adhesive. Consult Sarnafil Product Data Sheets for adhesive options and additional information.
2. Sarnaclad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 25 guage, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported Sarnafil membrane laminated on one side. The dimensions of Sarnaclad are 4 ft x 8 ft (1.2 m x 2.4 m) or 4 ft x 10 ft (1.2 m x 3.0 m). Consult Sarnafil Product Data Sheet for additional information.

### C. Perimeter Edge Flashing

1. Sarnaclad: A PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Sarnaclad is a 25 guage, G90 galvanized metal sheet with a 20 mil (1 mm) unsupported Sarnafil membrane laminated on one side. The dimensions of Sarnaclad are 4 ft x 8 ft (1.2 m x 2.4 m) or 4 ft x 10 ft (1.2 m x 3.0 m). Consult Sarnafil Product Data Sheet for additional information.

2. Non-Typical Edge: Project-specific perimeter edge detail reviewed and accepted for one-time use by Sarnafil's Technical Department. Consult Regional Technical Manager prior to job start for review and consideration for acceptance.

D. Miscellaneous Flashing

1. Sarnaflash: A prefabricated expansion joint cover made from Sarnafil membrane. Sarnaflash 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 4-1/2 inches (25 mm to 114 mm) across. Available in 40 foot (12 m) rolls. Consult Sarnafil Product Data Sheet for additional information.
2. Sarnareglet: A heavy-duty, extruded aluminum flashing termination reglet used at walls and large curbs. Sarnareglet is produced from 6063-T5, 0.10 inch – 0.12 inch (2.5 mm – 3.0 mm) thick extruded aluminum. Sarnareglet has a 2-1/4 inch (57 mm) deep profile, and is provided in 10 foot (3 m) lengths. Use prefabricated Sarnareglet mitered inside and outside corners where walls intersect. Consult Sarnafil Product Data Sheet for additional information.
3. Sarnastack: A prefabricated vent pipe flashing made from 0.048 inch (48 mil/1.2 mm) thick Sarnafil G410 membrane. Available in five different sizes. Consult Sarnafil Product Data Sheet for sizes and additional information.
4. Sarnafiller: A urethane sealant used for pitch pocket topping. Sarnafiller is a two component sealant. Sarnafiller cures with excellent elasticity and adhesion to various surfaces. Consult Sarnafil Product Data Sheet for additional information.
5. Sarnacorner: Prefabriated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or Sarnaclad base flashings. Sarnacorner is available in 2 outside sizes (5 inch and 8-1/2 inch diameter/127 mm and 215 mm) and 1 inside size. Consult Sarnafil Product Data Sheet for additional information.
6. Multi-Purpose Sealant: A proprietary sealant used at flashing terminations. Consult Sarnafil Product Data Sheet for additional information.
7. Sarnacol 2170 Adhesive: A solvent-based reactivating-type adhesive used to attach the membrane to the flashing substrate. Consult Product Data Sheets for additional information.

2.06 INSULATION

- A. Rigid Insulation, refer to Section 07210

2.07 ATTACHMENT COMPONENTS

- A. Membrane Adhesive

1. Sarnacol 2170 Adhesive: A solvent-based reactivating-type adhesive used to attach the membrane to the substrate, either horizontally or vertically. Consult Product Data Sheets for additional information. Application rates are as follows:

|                    | <u>Substrate Rate 1</u><br>Gallons/100 ft <sup>2</sup> |   | <u>Substrate Rate 2</u><br>Gallons/100 ft <sup>2</sup> |   | <u>Total Rate</u><br>Gallons/100 ft <sup>2</sup><br>(liters/meter <sup>2</sup> ) |        |
|--------------------|--|---|--|---|--|--------|
| Metal              | 0.75   | + | 1.00   | = | 1.75   | (0.71) |
| Plywood            | 1.00   | + | 1.00   | = | 2.00   | (0.81) |
| Concrete           | 1.00   | + | 1.00   | = | 2.00   | (0.81) |
| Isocyanurate Facer | 1.25   | + | 1.00   | = | 2.25   | (0.92) |
| Cellular Concrete  | 1.25   | + | 1.00   | = | 2.25   | (0.92) |
| Smooth asphalt     | 1.00   | + | 1.00   | = | 2.00   | (0.81) |
| Dens-Deck®         | 1.00   | + | 1.00   | = | 2.00   | (0.81) |

- a. Due to an increase in viscosity when the outdoor temperatures during installation are below 40°F (5°C), add 0.5 gal/100 ft<sup>2</sup> (0.2 l/m<sup>2</sup>) to rate for estimating purposes. Do not install when air temperature is within 5°F of dew point. Solvent evaporation time increases significantly when temperatures drop. Ensure first layer of Sarnacol 2170 is fully dry before second layer is applied for proper reactivation.
  - b. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.
2. Sarnacol 2121 Adhesive: A water-based adhesive used to attach the membrane to the horizontal or near-horizontal substrate. Consult Product Data Sheets for additional information. Application rates are as follows:

|                   | <u>Substrate Rate 1</u><br>Gallons/100 ft <sup>2</sup> |   | <u>Substrate Rate 2</u><br>Gallons/100 ft <sup>2</sup> |   | <u>Total Rate</u><br>Gallons/100 ft <sup>2</sup><br>(liters/meter <sup>2</sup> ) |        |
|-------------------|--|---|--|---|--|--------|
| Plywood           | 1.75   | + | 0  | = | 1.75   | (0.71) |
| Concrete          | 2.00   | + | 0  | = | 2.00   | (0.81) |
| Cellular Concrete | 2.00   | + | 0  | = | 2.00   | (0.81) |
| Dens-Deck®        | 1.75   | + | 0  | = | 1.75   | (0.71) |

- 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).
- b. Do not allow Sarnacol 212 adhesive to skin-over or surface-dry prior to installation of membrane.

- c. Use a water-filled, foam-covered lawn roller to consistently and evenly press the membrane into the adhesive layer.
- B. Sarnafastener-CD 10: A nail-in, corrosion-resistant fastener used with Sarnaplate-HD/CD, Sarnastop or Sarnabar to attach insulation or membrane to normal weight concrete roof deck. Sarnafastener-CD 10 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. Consult Sarnafil Product Data Sheet for additional information.
- C. Sarnafastener-HD: A #14 corrosion-resistant fastener used with Sarnaplate-HD/CD, Sarnastop or Sarnabar to attach insulation or membrane to normal-weight concrete or wood roof deck. Sarnafatener-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). Consult Sarnafil Product Data Sheet for additional information.
- D. Sarnastop: An extruded aluminum, low-profile bar used with certain Sarnafasteners to attach to the roof deck or to walls/curbs at terminations, penetrations and at incline changes of the substrate. Sarnastop is a 1 inch (25 MM) wide, flat aluminum bar 1/8 inch (3 mm) thick that has predrilled holes ever 6 inches (152 mm) on center. Consult Sarnafil Product Data Sheet for additional information.

## 2.08 WALKWAY PROTECTION

- A. Sarnatred: A polyester reinforced; 0.096 inch (96 mil/2.4 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic. Sarnatred is supplied in rolls of 39.3 inches (1.0 m) wide and 32.8 feet (10 m) long. Consult Sarnafil Product Data Sheet for additional information.
- B. Sarnapad: A 1/4 inch thick, injection-molded walkway pad with welding tabs made entirely of recycled PVC material. Used to install a continuous rooftop walkway network. Net dimensions are 1/4 inch tick x 24 inches long x 24 inches wide (6 mm x 0.6 m x 0.6 m). Consult Sarnafil Product Sheet for additional information.
- C. Sand-Coated Walkway: A fiberglass reinforced, 60 mil, weldable membrane with a thick sand-based coating on top. Net dimensions are approximately 150 mil (4 mm) thick by 26 inches (0.6), 39 inches (1.0 m), 78 inches (2.0 m) wide with varying lengths. The standard length is 32 feet (10 m). Consult Sarnafil Product Data Sheet for additional information.

## 2.09 MISCELLANEOUS ACCESSORIES

- A. Aluminum Tape: A 2 inch (50mm) 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 Sarnaclad joints.

- B. 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.
- C. Sarnamatic 641 mc: 220 volt, self-propelled, hot-air welding machine used to seal long lengths of Sarnafil membrane seams.
- D. Sarnasolv: A high quality solvent cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. Sarnasolv 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. Consult Sarnafil Product Data Sheet for additional information.

#### 2.10 SEALANTS AND PITCH POCKET FILLERS

- A. Sarnafil Multi-Purpose Sealant (for termination details).
- B. Sarnafiller (two-part urethane filler for pitch pocket toppings).
- C. Depending on substrates, the following sealants are options for temporary overnight tie-ins:
  - 1. Sarnafiller
  - 2. Spray-applied, water-resistant urethane foam.
  - 3. Mechanical attachment with rigid bars and compressed sealant.

#### 2.11 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 (wolmanzed 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.
- B. Plywood: When bonding directly to plywood, a minimum 1/2 inch (12 mm) CDX (C side out), smooth-surfaced exterior grade plywood with exterior grade glue shall be used. Rough-surfaced plywood or high fastener heads will require the use of Sarnafelt behind the flashing membrane. Plywood shall have maximum moisture content of 19% by weight on a dry weight basis.

**PART 3 EXECUTION**

3.01 INSPECTION

- A. Examine and verify that deck, insulation, wall, parapet, adjacent surfaces are dry, clean, smooth, and conditions are satisfactory to receive insulation and sheet roofing; and are free from depressions, waves, or projections, defects or deviations affecting quality of the work.
- B. Examine and verify that roof openings and penetrating elements through roof are solidly set, wood nailing and blocking strips are in place, roof drains are properly installed and roof curbs, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
- C. Do not apply roofing materials to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer, applicator, or Resident.
- D. Do no work until unsatisfactory conditions are corrected.
- E. Beginning installation means acceptance of existing surfaces, substrates, and conditions.

3.02 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Sarnafil Adhered roof system.
- B. 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.
- C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign materials, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All roof surfaces shall be free of water and ice.
- E. Sarnafil shall be applied over compatible and accepted substrates only.

3.03 PREPARATION OF SURFACES

- A. Thoroughly clean deck and parapet surfaces immediately prior to the installation of insulation and roofing using compressed air, vacuum or other approved methods.
- B. Remove oil and grease with commercial grade alkaline cleaner or solvent; thoroughly rinse and dry.

- C. Clean exposed metal surfaces by removing paint, rust, scale or any foreign matter.
  - D. Substrate Preparation: The Applicator shall load materials on the rooftop in such a manner to eliminate risk of deck overload due to concentrated weight.
    - 1. Poured Normal Weight Structural Concrete Deck: The roof deck shall be installed and cured in accordance with industry standards. The surface shall have a smooth and level finish and shall be free of dust, excess moisture, oil-based curing agents and loose debris. Sharp ridges or other projections above the surface shall be removed before roofing. An insulation recover board is required as a substrate to adhere to.
- 3.04 WOOD NAILERS
- A. Comply with provisions of Section 06100.
  - B. Install continuous treated wood nailers at the perimeter of the entire roof and around roof projections and penetrations. Height to match top of substrate or insulation to allow a smooth transition.
  - C. 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.
- 3.05 VAPOR RETARDER
- A. Provide between metal decks and insulation. Do not install between concrete decks and membrane.
  - B. Lap and seal side and end laps and penetrations in accordance with the instructions of the retarder manufacturer. Unless otherwise required by the membrane or retarder manufacturers, lay loose with only temporary restraint until insulation is installed over it.
- 3.06 INSULATION APPLICATION
- A. Insulation shall be installed according to insulation manufacturer's instructions.
  - B. Comply with the provisions and requirements of Section 03525.
- 3.07 MEMBRANE INSTALLATION

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- A. Comply with roofing system manufacturer's published instructions for each type of installation. The surface of the insulation or substrate shall be inspected prior to installation of the Sarnafil 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.
- B. Sarnacol 2121 Adhesive
1. Over the properly installed and prepared substrate, Sarnacol 2121 adhesive shall be poured out of the pail and spread using notched 1/4 inch x 1/4 inch (6 mm x 6 mm x 6 mm) rubber squeegees. The 2121 adhesive shall be applied at a rate according to Sarnafil 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.
    - a. Sarnacol 2121 shall not be used if temperatures below 40°F (5°C) are expected during application or subsequent drying time.
    - b. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.
  4. 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.
- C. Weld laps following written instructions and using welding equipment provided or approved by the membrane manufacturer. Width of laps will affect the method allowed for use in lap welding.
1. Workmen assigned to perform the lap welding shall have successfully completed a course of instruction provided by the manufacturer's representative prior to welding.
  2. All membrane to be welded shall be clean and dry.
- D. Weld Quality Control:
1. During welding operations, observe for visible evidence of acceptable conditions and results.



2. Check completed welded seams after cooling for continuity using a rounded screwdriver or similar blunt object.
3. Make daily evaluations of welded seams at locations designated by the manufacturer's representative or the Resident by taking 2 inch wide cuts through completed welds 3 times a day or more. Test welds by separating the membranes. Correct welds will display a failure from shearing of the membrane before separation of the weld.
4. Patch cut locations at no cost to the Owner.

### 3.08 MEMBRANE FLASHINGS

- A. 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 Resident. 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.
- B. Sarnacol Adhesive for Membrane Flashings
  1. Over the properly installed and prepared flashing substrate, Sarnacol adhesive shall be applied according to instructions found on the Product Data Sheet. The Sarnacol adhesive shall be applied in smooth, even coatings 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.
  2. 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.
- C. Sarnafil's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by Sarnafil prior to installation.
- D. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted in writing by the Resident.
- E. All flashing membranes shall be mechanically fastened along the counter-flashed top edge with Sarnastop at 6-8 inches (0.15 – 0.20 m) on center.
- F. Sarnafil flashings shall be terminated according to Sarnafil recommended details.
- G. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement. Consult Sarnafil Technical Department for securement methods.

3.09 SARNACLAD METAL BASE FLASHINGS/EDGE METAL

- A. 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 Resident. 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.
- B. Sarnaclad metal flashings shall be formed and installed per the Detail Drawings.

3.10 METAL FLASHINGS

- A. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
  - 1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
  - 2. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) – latest issue.

3.11 PROTECTION

- A. Protect finished installation from physical damage and soiling where other work is performed over roofing.
- B. After installation, close off area to prevent unauthorized traffic.

3.12 FIELD QUALITY CONTROL

- A. Provide for roofing project a minimum 12 hours per week of manufacturer's field inspection until each typical condition has been completed, and a minimum of 8 hours per week inspection thereafter to completion.

3.13 COMPLETION

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

3.14 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 2.09. 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.

\*\*\*END OF SECTION\*\*\*