

1 GENERAL

A. GENERAL REQUIREMENTS

Conform to the provisions of Part I and DIVISION 1.

B. JOB CONDITIONS AND REQUIREMENTS

1. Visit the site and become familiar with existing site conditions that affect the Work of the Section. Keep dust build-up to a minimum. Keep streets and driveways clean and free of debris and open for traffic.
2. Work of this section must not interfere with the Owner's normal business routine and hours. The Construction Schedule may require after business hours or week-end work. Coordinate schedule with Building Manager and Owner's Project Representative.

C. PROTECTION

1. Temporary Partition:
If required for protection of Owner's property and customers, provide temporary partitions around areas of demolition work. Provide protection as required to keep dust and moisture confined to the immediate work area.
2. Coordination:
Coordinate protection procedures with Owner's Project Representative.
3. Utilities:
Protect and mark any utilities encountered; notify proper authorities and make dispositions as directed, at no additional cost to Owner. Keep existing utilities in continuous operation.

D. OBJECTIONABLE NOISES

Work requiring use of air hammers and other noisy equipment shall be coordinated with Owner's Project Representative at all times. The construction schedule may require after business hours or week-end work.

E. SUBMITTAL

At the conclusion of the project, the Contractor shall be responsible for submitting along with the closeout documents the Frontier Communications Calculated Plant Displaced Form and the Equipment Master Work Sheet. Complete the Description, Quantity, and Unit columns for each item removed from the building or site as part of this project. Mechanical and Electrical shall submit their respective portions of the work on separate forms. Refer to attached copies of this form.

2 PRODUCTS

Not applicable.

3 EXECUTION

A. EXISTING ROOFING:

1. At the designated roof sections remove and legally dispose of the existing roofing materials as shown on the Architectural Drawings. Refer to Architectural Drawings for locations and details for scheduling.
2. Remove only as much area of the existing roofing systems as can be covered by the new roofing system the same day to provide a watertight condition at the finish of each days work

B. CUTTING

All cutting of concrete or masonry shall be performed with carbide-tipped power driven tools. All cuts shall be square and true. No cover-cutting allowed, hand chip to square up corners of openings. Repair over-cuts as directed, and at no increase to contract costs. Core drill circular openings. Use carbide tip drills for smaller holes. Jack and rotary type hammers over 3/8" drive not permitted. Refer to Architectural drawings for locations and details for new work.

C. EXISTING ABANDONED MECHANICAL AND ELECTRICAL ITEMS

Remove existing abandoned mechanical and electrical items as noted on the drawings.

D. OTHER TRADES

Coordinate demolition of electrical and mechanical items with electrical and mechanical sub-contractors. Avoid damage to personnel and public from contact with any existing electrical conduit or wiring.

E. SALVAGE

All items removed, unless requested by the Owner or noted to remain the property of the Owner, shall become property of the Contractor and shall be removed from the site at Contractor's expense.

F. PATCHING AND REPAIR

Patch and repair to match adjacent finishes where existing work is removed and where new work occurs. Extent includes floors, walls, and ceilings for all work in this contract including mechanical and electrical. Make neat repairs with terminal edges parallel to the building major axis. Use materials of matching texture and finish. Seal around ducts and pipes which project through floor slabs and walls, refer to Section 07900.

G. CLEAN-UP

Remove all debris from site after each day's work. Do not allow to accumulate on site. Haul away from site and dispose of at Contractor's expense.

END OF SECTION

SECTION 07412, PREFORMED METAL ROOFING

1 GENERAL

A. GENERAL REQUIREMENTS

Conform to the provisions of Part I and DIVISION 1.

B. WORK IN OTHER SECTIONS

Submittals, covered in Section 01300.

Project closeout, covered in Section 01700.

Flashing and Sheet Metal, covered in Section 07600.

C. DESCRIPTION OF WORK

The extent of work for Preformed Metal Roofing is indicated on the Drawings and includes, but is not limited to, furnishing and installing metal roofing, caps, trims, gutter, and with all accessories necessary to make a complete watertight installation. Refer to Drawings for actual roofing installation.

D. QUALITY ASSURANCE

In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Architectural Sheet metal Manual", latest edition, of the Sheet Metal and Airconditioning Contractors National Association, Inc.

E. CHANGE ORDER OVERHEAD AND PROFIT

If change orders result in additional cost to subcontractor, the actual cost plus fifteen percent (15%) overhead and profit shall be added to the Contract Sum. If changes result in decreased cost to subcontractor, the actual savings shall be deducted from the Contract Sum.

F. SUBMITTALS

1. Shop Drawings:

Before any material is delivered to the job site, submit complete Shop Drawings of all Preformed Metal Roofing proposed to be furnished and installed to the Architect or his review in accordance with Section 01340 of these Specifications. Submit sample to Architect for pattern approval.

2. Manufacturer's Warranty:

Submit processed signed and countersigned 20-year written warranty in accordance with Section 01700 of these Specifications.

3. Applicator's Guarantee:

Furnish written guarantee for two years covering repairs required to keep roof and flashings watertight. Make repairs at no expenses to the Owner.

G. ACCEPTABLE MANUFACTURERS

IMSA Building Products, Vincent Brass and Aluminum Company (ColorKlad), Architectural Engineering Products Company (AEP), Foremost Manufacturing Co., or as approved in advance by the Architect.

H. PRODUCT HANDLING

1. Protection:

Use all means necessary to protect Preformed Metal Roofing materials before, during, and after installation and to protect the installed work and materials of all other trades.

2. Replacements:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

I. REQUIRED APPROVAL

Roofing system shall conform to Factory Mutual or UL wind uplift requirements for 90 MPH exposure C.

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Review and acceptance by Industrial Risk Insurers shall be obtained prior to start of any roofing work.

2 PRODUCTS

A. QUALITY OF MANUFACTURER

Product specified is ISMA Building Products. Approved equal products of AEP, Foremost, or "ColorKlad" as manufactured by Vincent Brass & Aluminum Co. are acceptable or as approved in advance by the Architect.

B. MATERIALS

1. Prefinished Metal Roofing and Gutters:

Metal roof material shall be,

Klip-Rib, 22-Gauge, ASTM 924 & A653, G 90 Galvanized Steel., integral self-locking system, prepainted, galvanized roofing and flashing sheets as manufactured by ISMA Building Products, 2141 Milwaukee Way, Tacoma, Washington 98421. Self-locking panels shall be Grade A steel with a Zincolume Protective coating. Protective coating components, zinc 45%, aluminum alloy 55% coating thickness 1.9 mils.

2. Color and Texture:

Color – Duratech 5000 Colors – Old Zinc Gray. Standard.

3. Physical Qualities:

a. Coating system shall meet the following requirements:

- (1) Weathering: No checking, blistering or adhesion loss when tested for 5,000 hours in accordance with ASTM G23-69.
- 2) Chalking: Will not chalk greater than number 8 rating when tested for 2,000 hours in accordance with ASTM D-659.
- (3) Fading: Color change will not exceed 5 NBS units when tested for 5,000 hours in accordance with STM D-2244.
- (4) Humidity: Shall be less than 5% of number 8 blisters when tested for 5,000 hours in 100% humidity at 100 degrees F. in accordance with ASTM D-2247.
- (5) Salt Spray: No more than 3/16" creep or tape off from scribe and less than 5% number 6 blisters when tested for 1,000 hours in 5% salt fog at 95 degrees F. in accordance with ASTM B-117.
- (6) Flexibility: No rupture of coating when subjected to a 180 degree bend around a 1/8" namdrel in accordance with ASTM D-1737.
- (7) Hardness: Will be F-2H pencil hardness when tested in accordance with D-3363.

3 EXECUTION

A. FABRICATION

Fabricate in accordance with reviewed Shop Drawings and above referenced standards using conventional hand or power tools. Keep cut edges sharp, clean, properly dressed, and closely aligned.

B. INSTALLATION OF PREFINISHED ROOFING

Install in accordance with reviewed Shop Drawings and above referenced standards. Exercise care during fabrication and erection to avoid damage. Install roofing panels with manufacturer's standard concealed fastening system. Where necessary to touch-up installed work, used manufacturer's touch-up finish and apply in accordance with the manufacturer's written directions. Install roofing with concealed fastening system. Allow for expansion and contraction. Coordinate roof penetrations of other trades and flash to be watertight. After installation of standing seam panels, remove the strippable film per manufacturer's recommendations.

C. INSTALLATION OF PREFINISHED GUTTERS AND DOWNSPOUTS

Gutters shall be constructed to size and shapes detailed on drawings. Install in locations noted on the

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drawings. Provide round nipples for connection to downspouts.

D. CLEANING

Remove debris from site.

END OF SECTION

1 GENERAL

A. GENERAL REQUIREMENTS

Conform to the provisions of Part I and DIVISION 1.

B. WORK IN OTHER SECTIONS

Flashing and sheet metal, covered in Section 07600.

C. CHANGE ORDER OVERHEAD AND PROFIT

If change orders result in additional cost to subcontractor, the actual cost plus fifteen (15%) overhead and profit shall be added to the Contract Sum. If changes result in decreased cost to subcontractor, the actual savings shall be deducted from the Contract Sum.

D. DESCRIPTION OF WORK

Provide a recover roofing system (new roofing membrane and base sheet) over existing roofing system. Remove areas of wet roofing system discovered including existing roof membrane, and any wet insulation down to the original existing metal deck. Inspect all decks to determine if any replacements or corrections need to be made in the deck structures before new roofing work. Prepare all existing surfaces to receive new roofing membrane and base ply and in wet areas replace and prepare if necessary insulation. Furnish and install all new roofing and insulation systems including, but not limited to, flashings, insulation, boots for all conduits or pipes penetrating roof membrane, fasteners, and roofing membrane for a complete watertight roofing system. All required accessory items to meet the manufacturer's warranty for the actual job conditions shall be included in the bid and will not be allowed as a basis for a change order.

E. REQUIRED APPROVAL

Roofing system shall conform to Factory Mutual I-90 windstorm rated construction and UL Class A fire hazard.

Review and acceptance by the Roofing Manufacturer shall be obtained prior to start of any roofing work. Contractor shall schedule approximately 1 weeks time for review in the construction schedule.

F. QUALITY ASSURANCE

1. Applicator Qualifications:

The roofing contractor shall be approved by the manufacturer of the roofing system at time of bid. Submit written documentation from manufacturer at Pre-Construction Conference. The General Contractor shall confirm the manufacturer approved status prior to the bid. Work in this Section to conform to

NRCA Roofing and Waterproofing Manual and Manufacturer's written instructions.

2. Roof Systems:

Roof system shall be from a single source manufacturer within the scope of the specific types of products named. Products relating directly to the performance of the selected system which are not manufactured by the system manufacturer, shall be approved in writing by the system manufacturer.

3. Roofing Installation Completion:

Upon completion of the installation, if required by the Roofing Manufacturer, the Contractor shall have a Technical Representative of the roofing manufacturer inspect the membrane roofing system to ascertain that the system has been installed according to the roofing manufacture's published specification and details applicable at the time of bid to maintain all roofing warranties.

4. Pre-installation Conference: Roofing Contractor shall schedule a Pre-Installation conference prior to commencing roofing work.

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G. SUBMITTALS

1. Letter from roofing manufacturer affirming applicator's eligibility to apply the specified roofing system in order to maintain warranties. If it is determined after the bid opening, that the low roofing bidder is not approved by the roofing manufacturer, the General Contractor will be required to use a roofing manufacturer approved roofing contractor.
2. Submit shop drawings to the roofing manufacturer as required for approval prior to the start of any work as required by the roofing manufacturer to ensure compliance with warranty requirements.
3. Before Start of Work: Submit for approval five (3) copies of the manufacturer's most recent published specification and details. The material shall not be ordered until the submittals have been approved.
5. At Completion of Project:
Submit written approval of warranty from roofing manufacturer.
Submit written guarantee from applicator.

H. PRODUCT DELIVERY, STORAGE, AND HANDLING

1. Delivery: Roofing material shall be delivered to the site in the manufacturer's unbroken containers and shall bear the manufacturer's printed labels.
2. Store: Materials shall be stored in dry, protected areas in an upright position. Control temperature of storage areas in accordance with manufacturer's instructions. Storage of liquid adhesives and sealants shall be stored at a minimum of 60 degrees Fahrenheit before use.
3. Insulation: Insulation and underlayment must be stored so it is kept dry and is protected from the elements. Stored insulation shall be weighted to prevent possible wind damage.
4. Solvent: Do not store adhesive containers with opened lids due to the loss of solvent which will occur from flash off.

I. JOB AND PROJECT CONDITIONS

Follow local, state and federal regulations, safety standards and codes. When a conflict exists, use the stricter document. Ensure the roof deck is structurally sound to support the live and dead load requirements of roofing system and sufficiently rigid to support construction traffic. Do not execute the work of this Section unless the substrate is dry, free from debris and dust. The installed roofing membrane shall be protected and areas of concentrated traffic should be confined to preserve the finish surface of the membrane and prevent discoloration due to installation. Bring all conditions that would impair the work and performance of this Section to the attention of the Owner's Project Representative prior to commencement.

J. CONFLICTS

Immediately refer any conflicts among requirements of these specifications and drawings, those of regulatory agencies, material manufacturer's recommendations, and good roofing practices, to the Architect to resolve.

K. WARRANTY/GUARANTY

Manufacturer shall provide a 20 year NDL guaranty covering all materials and workmanship.

L. APPLICATOR'S GUARANTEE

Before work is accepted, furnish written guarantee for two years covering repairs required to keep roof and flashing watertight. Guarantee must cover ordinary wear and tear of elements and defects due to faulty materials and workmanship. Make repairs at no expense to the Owner. Starting date of the guarantee shall be the date of the Substantial Completion Certificate.

M. NOTIFICATION

Notify Architect and Owner's Representative at least 48 hours before starting work.

N. REFERENCE

The latest edition of the roofing manufacturer's Design, Specification and Application sections of the manufacturer's technical manual, latest edition.

2 PRODUCTS

A. GENERAL

The new roofing system shall be products of all the Roofing Manufacturer. as specified hereafter.

B. MEMBRANE MATERIALS

1. **Base Ply:**

Derbibase, fiberglass reinforced 80 mil thick APP modified base ply.

2. **Roof Membrane:**

Derbicolor GP/FR Dual reinforcement 180 mils thick APP Modified Bitumen Sheet with factory applied granules on the top exposed surface, color as selected by Owner.

3. **Membrane Adhesive:**

Permastic Cold Application Adhesive with a maximum VOC Content of 184 grams/liter.

C. BITUMINOUS MATERIALS

1. **Cold Adhesive:**

Cold application adhesive maximum solvent content 15%, minimum solid content 82%, Maximum VOC content 184 grams/liter.

2. **Mastic Sealant:**

Cold Application Trowel Grade Adhesive Maximum solvent content 7 %, non-hardening, nonskinning, nondrying.

3. **Pitch Pan filler:**

Pourable Sealer or Perflash

4. **Caulking Sealant:**

All sealant shall comply with F.S. TTS 0023c. and should consist of a single component, high performance, elastomeric compound as manufactured by one of the following or equal.

- a. Sonolastic NP 1 by Sonneborn Building Products, Minneapolis, MN.

D. ROOF INSULATION

Roof insulation where required to be replaced shall be a polyisocyanurate foam which has been approved by Factory Mutual and the roofing manufacturer for use in this roofing system. Apache insulation is not acceptable.

C. CANT STRIPS

Cant and Tapered Edge Strips: Non flammable Perlite Insulation or salt Preserved wood preformed to 45 degree angle, meeting ASTM D728 and F.S. LL-I-535.

3 EXECUTION

A. GENERAL

Remove trash, debris, grease, oil, water, moisture, and contaminants which may affect roofing system installation. Protect adjacent areas from damage with tarpaulin or other durable materials.

B. REFERENCE

The most current catalog edition for design Criteria, Application and Standard Details published by the

SECTION 07500, MEMBRANE ROOFING

manufacturer of the roofing system shall be considered part of this specification and shall be referred to for more specific application procedures regarding roofing insulation, membrane, and base flashing.

C. EXAMINATION

Verify that any existing Insulation is not wet.

D. QUALITY ASSURANCE

1. Applicator - Roof Manufacturer Licensed Applicator:
Applicators Experience: Continuously applied modified Bitumen system in the State of Washington for a minimum of five (5) years and currently approved by Performance Roof Systems, Inc. to install a guaranteed roof.
2. Installers - Roofing Contractors Men:
 - a. Completely familiar with the specified requirements and respective Job Details along with the methods needed for proper installation of work in this section. (Copy of specification must be on site and accessible at all times.)
 - b. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the installation of this product.

E. DECK PREPARATION

Deck and deck surface shall be suitable to receive new roof insulations and roof membrane. Verify all surfaces are dry and reasonably smooth. Notify Architect if deck surface is found to be unsuitable; make minor corrections as required to conform to insulation and roof manufacturers installations instruction.

F. PROTECTION

1. Protect building surfaces against damage from roofing work
2. Where traffic must continue over finished roof installation, protect membrane with an additional layer of membrane or suitable material.

G. GENERAL APPLICATION REQUIREMENTS

1. Cant strips: Non flammable Perlite or Fiberglass 4 inch by 4 inch.
2. Drain and Vent Leads: Roof drain lead flashing and vent pipe lead flashing shall be minimum 4 lb. Lead flashing.

H. INSULATION INSTALLATION

1. General:
 - a. Keep insulation dry at all times. Trim and discard any units with broken corners or similar defects.
 - b. Install only as much roof insulation as can be covered with roofing membrane the same day.
2. Installation:
Insulation system shall be fastened and secured in accordance with manufacturer's requirements to maintain warranty.

I. MODIFIED BITUMINOUS SHEET ROOFING SYSTEM

Remove existing Scuppers, Edge metal and Gutters and roof jacks.
Cut out and remove existing Base Flashing, Roofing and wet Roof Insulation where in preparation shown on the drawings in preparation for the new Roof Membrane.

J. ROOFING INSTALLATION

1. Install new Polyisocyanurate Roof Insulation set in Oly-Bond 500 where existing wet Polyisocyanurate was removed.
2. Install Derbibase over existing roofing set in Permastic Cold Adhesive.
4. Install Derbicolor GP/FR membrane starting at the low point on the roof to the high point. Set in Cold Adhesive to base ply, then heat weld side and end laps. Roll laps with a 20 lb. Steel roller in accordance with manufacturers instructions.

K. FLASHINGS AND ACCESSORIES

1. Apply Derbigum GP/FR flashings as recommended by the Performance Roof Systems flashings shall be installed per details P-1 through P-20.
2. Install new 24 Gauge metal Cap Flashing at all exterior walls (color as selected by the Owner), Match existing shape without the raised joint.
3. Install new Drain inserts into existing drain pipes. Use Hercules or other approved drain inserts.

L. CURBS

All curbs for roof top equipment must be built up a minimum of 8" nominal off top of the finished roof surface. Cricket around curbs for drainage.

M. CUTOFFS

Each day remove only as much existing roofing and insulation as can be completely covered with complete new insulation/roofing system. At the end of each days work, the roofing system shall be completely watertight; under no circumstances will moisture be allowed to enter the interior of the building. Contractor shall be responsible for any damage to the Owner's telephone equipment inside the building.

N. FINAL INSPECTION AND CORRECTIONS

Finished roof membrane must be solid and tight. Inspect roof and make necessary corrections/repairs to ensure proper adhesion. All repairs (delaminated areas, buckles, and voids) to be in accordance with roofing manufacturers recommendations. The Contractor must exercise care and observe appropriate safety precautions. For Basic Safety Measures, refer to the manufacturer's Roofing Membrane Reference and Application Guide.

O. CLEANING

Remove all excess material and debris from site. Remove bonding adhesives from surfaces, other than those requiring roof coverings, and leave in clean condition free from droppings and stains.

P. MANUFACTURERS GUARANTEE

Provide a manufacturers 20 year non-prorated, Roofing Guarantee including flashing endorsement, covering both material and workmanship. Guarantee shall be an NDL guarantee with a dollar limit penal sum.

END OF SECTION

SECTION 07540 - SINGLE PLY MEMBRANE ROOFING (ALTERNATES)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

- 1. Mechanically fastened single ply membrane roofing system.
- 2. Roof insulation (tapered).
- 3. Cover Board
- 4. Fasteners
- 5. Adhesive for Flashings
- 6. Roof Membrane Flashings
- 7. Walkpads

- A.5 System Description:

- 1. Roof Assembly: Top Down Summary

- a. Mechanically fastened single ply membrane with membrane base flashings and penetrations flashings.
- b. New mechanically fastened cover board.
- c. Existing rigid insulation
- d. Roof deck.

- B. Related Sections include the following:

- 1. Division 7 Section "Sheet Metal Flashing and Trim" for roof penetration flashings, flashings, and counterflashings.
- 2. Division 7 Section "Joint Sealants."

1.3 DEFINITIONS

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

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

SECTION 07500, SINGLE PLY MEMBRANE ROOFING

- B. **Material Compatibility:** Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. **FMG Listing:** Provide roofing membrane, base flashings, and component materials that comply with FM Windstorm Classification 1-90 requirements as part of a membrane roofing system.
- D. **Fire-Test-Response Characteristics:** Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
 - 1. **Exterior Fire-Test Exposure:** Class A, for application and roof slopes indicated.

1.5 SUBMITTALS

- A. **Product Data:** For each type of product indicated.
- B. **Letter and certificate from Roofing Manufacturer** confirming that the Contractor is an authorized applicator of the specified roof system.
- C. **Shop Drawings:** For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Crickets, saddles, and tapered edge strips, including slopes
 - 4. Insulation/coverboard fastening patterns.
- D. **Samples for Verification:** For the following products:
 - 1. 12-by-12-inch (300-by-300-mm) square of sheet roofing, of color specified, including T-shaped side and end lap seam.
 - 2. 12-by-12-inch (300-by-300-mm) square of walkway pads or rolls.
- E. **Uplift and Fastener Calculations:** Prior to roof application, provide approved uplift resistance calculations prepared by the manufacturer's technical department or a licensed structural engineer indicating the type of fasteners to be utilized, required spacing of fasteners, minimum penetrations through the deck, and fastener layout plan for both the insulation assembly and the single ply membrane. Also provide required number of perimeter half sheets and approved perimeter half sheet layout plan. All calculations should meet the uplift requirements listed in the project documents.
- F. **Manufacturer Certificates:** Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements.
- G. **Qualification Data:** For Installer and manufacturer.
- H. **Product Test Reports:** Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

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- I. Research/Evaluation Reports: For components of membrane roofing system.
- J. Maintenance Data: For roofing system to include in maintenance manuals.
- K. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Roofing system shall be applied only by a Roofing Contractor (Applicator) authorized by the manufacturer prior to bid. Installer must have substantial experience with installations of the approved roofing system on projects of similar scale and complexity, be regularly engaged in such projects and have a record of successful in-service performance.
- B. Single Installer Responsibility: A single installer shall perform the work required of this section and Section 07620 – Sheet Metal Flashing and Trim, including sheet metal flashing, as required by this specification; and shall be a firm specializing in roofing system work who has been in business under the same name and ownership for at least 5 years, capable of showing successful installations similar to the work required for this project. Installer shall be approved by Roofing System Manufacturer and submit certification of this approval along with the bid.
- C. Installer Field Supervision: Installer shall maintain full-time supervisor/foreman on project site during times in which roofing work is in progress. Supervisor shall have experience in roofing work similar in nature and scope to the specified roofing.
- D. Pre-Roofing Meeting: Organize and conduct a meeting at the construction site 2 weeks before scheduled start of roof system installation with roofing installer; installer of each component of related work, including deck or substrate construction, roof equipment, penetrations of roof deck, and other work integral with or adjacent to roofing; the Architect; the Owner; roofing membrane manufacturer's representative; and other parties involved with roofing system performance, including independent testing agencies, factory mutual representative, and governing authorities.
 - 1. Walk roof areas to review and discuss substrate preparation including repair of unacceptable surfaces, roof drainage, penetrations, equipment curbs, and work performed by other trades which requires coordination with roofing system.
 - 2. Examine deck for proper flatness and slope, review structural capability for supporting roofing system and methods of fastening.
 - 3. Review contract document requirements and submittals for roofing system, including roofing schedule, inspection and testing, and environmental conditions. Identify what are considered unacceptable weather conditions for roofing, and which governing regulations or insurance requirements will affect roofing system installation.
- E. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and the manufacturer.
- F. All work pertaining to the installation of membrane and flashing shall only be completed by Applicator personnel and authorized by the manufacturer in those procedures.
- G. Single ply membrane to have no base formulation and chemistry changes in the last (10) years, including no changes in base polymers, UV stabilizers, and fire retardants, as certified in writing by the manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation. The manufacturer wrapping will not be considered sufficient weather protection.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

- A. The Contractor is responsible for maintaining the building in a watertight condition. Coordinate all work to ensure, on a daily basis, that the building, its finishes, and furnishings, and all new work are protected from damage or moisture and that the roof system remains watertight.
 - 1. Do not remove existing roofing from an area larger than can be made watertight by the end of the working day.
 - 2. Do not assume weighted or nailed visqueen sheet to be watertight.
 - 3. All single ply seams shall be cleaned and heat welded by the end of each working day.
- B. All surfaces to receive new insulation, membrane or flashing shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.
- C. 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.
- D. 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.
- E. 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 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.

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- F. 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. Provide necessary protection to prevent debris from entering the interior spaces. The contractor is responsible for maintaining the building interior in a dust and dirt free condition.
- G. 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 copied to the manufacturer) to the Owner's representative for corrective action prior to installation of the roof system. If any drains need to be temporarily blocked during roofing application, the Applicator shall be responsible for providing alternative drainage, to prevent any overloading of the roof structure.
- H. Site cleanup, including both interior and exterior building areas that have been affected by construction shall be completed to the Owner's satisfaction. All landscaping and finishes shall be restored to the pre-job condition.
- I. Any adhered membrane shall not be installed under the following conditions without consulting the manufacturer's technical department 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 to the wall flashing area.
- J. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesives odors could enter the building. Coordinate the operation of the vents and air intakes in such a manner as to avoid the intake of adhesive and other odors while ventilating the building. Keep lids on unused cans at all times.

1.9 WARRANTY

- A. Manufacturer NDL Labor and Materials Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace all components of single ply membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
 - a. 20 year warranty to cover material and labor for repair or replacement for the full 20 years.
 - 2. Wind Speed: Warranty shall cover membrane roofing system failure in wind conditions up to and including 85 mph sustained winds.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, to perform in a watertight manner and free of defect for the following warranty period:
 - 1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide products complying with requirements of the contract documents and made by one of the following:
- a. ALTERNATE NO. 1 - Sika Sarnafil (Sarnafil 60-mil PVC mechanically fastened assembly).
 - b. ALTERNATE NO. 2 - Seamon Corporation (Fiber-Tite-XT KEE 50-mil mechanically fastened assembly)
 - c. ALTERNATE NO. 3 - GAF (Everguard 60 white TPO 60-mil mechanically fastened assembly)
 - d. ALTERNATE NO. 4 - Carlisle Syntec (Sure-Weld reinforced white .060" thick TPO mechanically fastened assembly)

2.2 SINGLE PLY ROOFING MEMBRANE

- A. ALTERNATE NO. 1 - Sarnafil Inc.: S327 Mechanically attached, PVC sheet not less than 0.060 (60 mils) thick.
1. Color: White.
 2. Reinforcement: Polyester.
- B. ALTERNATE NO. 2 - Seamon Corporation: Fibertite-XT Mechanically attached, EIP (ethylene interpolymer) alloy membrane, 0.050 inches (50 mils) thick.
1. Color: White
 2. Reinforcement: Polyester.
- C. ALTERNATE NO. 3 - GAF: EverGuard 60 TPO Mechanically attached, thermoplastic polyolefin membrane, (60 mils) thick.
1. Color: White
 2. Reinforcement: Polyester.
- D. ALTERNATE NO. 4 - Carlisle SynTec Incorporated: Sure-Weld reinforced TPO Mechanically attached, thermoplastic polyolefin membrane, 0.060 inches thick.
1. Color: White
 2. Reinforcement: Polyester.

2.3 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as single ply field sheet membrane, unless otherwise directed by the manufacturer. Sarnafil baseflashing to be fully adhered G-410 60 mil, unless otherwise instructed by the manufacturer for project conditions.

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- C. Bonding Adhesive: Manufacturer's standard approved bonding adhesive for installation base flashing membrane.
- D. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.
- F. Multi-Purpose Tape: High performance sealant tape used with metal flashing as a preventive measure against air and wind blown moisture entry. (Note: Not sure where this would be used. Any membrane that is extending onto sheet metal should be heat welded to clad metal flashing, coating with the same material as the single ply.)
- G. Solvent: Manufacturer approved high quality membrane cleaner used for the general cleaning of residual asphalt, scuff marks, etc., from the membrane surface. 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 as it is unrolled. (Note: As approved by the roof system manufacturer.)
- H. Miscellaneous Accessories:, Preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, termination reglets, cover strips, and other accessories, as required by the roof system manufacturer.
- I. Splash pads: Provide new sheet metal splash pads under downspouts that discharge onto the roof. Adhere splash pads to single ply membrane protection sheets. Provide precast concrete splash pads for any downspouts discharging onto the ground.
- J. Sealant: Manufacturer sealant as approved for direct contact with single ply membrane.
- K. Vertical separation board: 1/4" Dens Deck Prime to be mechanically fastened at vertical transitions prior to application of single ply baseflashing membrane.

2.4 ROOF INSULATION

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from roofing manufacturer's standard sizes and of thickness indicated and or required to meet required R-value and finished slope requirements for drainage.
- B. Polyisocyanurate Board Insulation tapered and flat stock: Rigid cellular foam, complying with ASTM C 1289, Type II, Class 2, premium performance coated glass facer, both faces, with the following characteristics:
 - 1. Compressive Strength: 20 psi.
 - 2. Manufacturer: As approved by the single ply manufacturer.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.5 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.
- C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch (6 mm) thick.
 - 1. Product: Subject to compliance with requirements:
 - a. "Dens-Deck by Georgia-Pacific Corporation.

2.6 WALKWAYS

- A. Flexible Walkways: polyester reinforced, 0.135 inch (3 mm), weldable membrane with surface embossment. Used as a protection layer from rooftop traffic and acceptable to membrane roofing system manufacturer.
 - 1. Supplied in rolls with a minimum width of 36" wide.

PART 3 - EXECUTION All roofing to be installed per the contract documents, the manufacturer's installation instructions, and NRCA. When in conflict, use most stringent requirement.

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that deck is securely fastened with no projecting fasteners and with no adjacent unit in excess of 1/16 inch (1.6mm) out of plane relative to adjoining deck.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

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- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the adhered roof system.
- B. The Applicator shall inspect the substrate for defect 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 or foreign material, oil and grease. Roofing shall not start until defects have been corrected.
- D. All roof surfaces shall be free of water, ice and snow.
- E. Membrane shall be applied over compatible and acceptable substrates only.

3.4 INSULATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.
- C. Install tapered and flat stock insulation under area of roofing to conform to required R-value and slopes indicated.
- D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 1/2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 12 inches in each direction. Temporarily secure insulation as necessary to prevent shifting/movement of individual boards and layers.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - 1. Cut and fit insulation tightly abutting all nailers, projections, vertical transitions, and penetrations.

3.5 MECHANICALLY FASTENED COVER BOARD

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Stagger joints from joints in insulation below a minimum of 12 inches in each direction. Install cover board according to the manufacturer's instructions.
 - 1. Mechanically fasten coverboard according to the project uplift requirements and the requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
 - 2. If required, increase fastening at the perimeter and corners as necessary to meet project uplift requirements.

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3. Fasteners secured to a metal deck shall penetrate the upper flutes only and penetrate a minimum $\frac{3}{4}$ " through the underside of the upper flute and no more than $1\frac{1}{2}$ inch.
4. Fasteners secured to a wood deck shall penetrate the underside of the wood deck a minimum $\frac{1}{2}$ inch and no more than 1 inch.

3.6 MECHANICALLY FASTENED ROOFING MEMBRANE INSTALLATION

- A. Mechanically fasten the single ply roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.
 1. Install sheet according to ASTM D 5036.
 2. Do not allow any asphalt-based product (including but not limited to asphalt roof cement and various self adhering membranes) to come in direct contact with the single ply field and baseflashing membrane at any location, unless written approval is provided by the manufacturer.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing as required by the manufacturer.
- E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.
- F. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity.
 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas. Contractor to provide written documentation of field test of membrane seam welds and notify the owner, owner's representative, and manufacturer immediately if the seam adhesion is less than required by the manufacturer.
 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet minimum requirements.
- G. Spread approved sealant over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

3.7 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply mechanically fastened $\frac{1}{4}$ " Dens Deck Prime separation board to vertical substrate prior to application of single ply baseflashing membrane where called out in the architectural details.

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- C. Apply approved bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- D. Flash penetrations and field-formed inside and outside corners with preformed manufacturer flashings.
- E. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.
- F. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
- G. All flashing shall extend a minimum of 8 inches (0.2 m) above the finished roof plane unless otherwise accepted in writing by the Owner's representative and the Manufacturers Technical Department.
- H. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be pre-formed and hot-air welded into place.
- I. All flashing that exceeds 30 inches (.75 m) in height shall receive additional securement. Consult Manufacturer's Technical Department or securement methods.

3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for

SECTION 07500, SINGLE PLY MEMBRANE ROOFING

deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates, and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction

END OF SECTION

1 GENERAL

A. GENERAL REQUIREMENTS

Conform to the provisions of Part I and DIVISION 1.

B. WORK IN OTHER SECTIONS

Sealants and caulking, covered in Section 07900.

C. CHANGE ORDER OVERHEAD AND PROFIT

If change orders result in additional cost to subcontractor, the actual cost plus fifteen percent (15%) overhead and profit shall be added to the Contract Sum.

If changes result in decreased cost to subcontractor, the actual savings shall be deducted from the Contract Sum.

D. DESCRIPTION OF WORK

The flashings and sheet metal work required for the Work under this Section as noted and detailed on the Drawings and include, but is not necessarily limited to, furnishing and installing new flashing and sheet metal as required for a complete watertight installation.

E. QUALITY ASSURANCE

1. Qualifications of Installers:

Provide at least one person who shall be present at all times during execution of the work of this Section and who shall be thoroughly trained and experienced in the materials and methods required and who shall direct the entire flashing and sheet metal fabrication and installation.

2. Codes and Standards:

In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations contained in "Architectural Sheet Metal Manual", latest edition, of the Sheet Metal and Air Conditioning Contractors National Association, Inc.

F. SUBMITTALS

Within 7 days after award of Contract, and before any flashing and sheet metal is delivered to the job site, submit complete Shop Drawings of all flashing and sheet metal proposed to be furnished and installed to the Architect for his review in accordance with Section 01340 of these Specifications.

G. PRODUCT HANDLING

1. Protection:

Use all means necessary to protect flashing and sheet metal materials before, during, and after installation and to protect the installed work and materials of all other trades.

2. Replacements:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

H. DIMENSIONS

Verify dimensions on job; correlate with adjoining work.

I. PRODUCT DATA

Submit manufacturers' published literature for specified products and accessories as applicable, including manufacturers' specifications, physical characteristics and performance data.

Submit as a supplement, manufacturers' instructions and directions for application if not included in manufacturers' published literature.

Submit in accordance with Section 01340.

J. STANDARD SPECIFICATION

Conform to recommendations of "Architectural Sheet Metal Manual", latest edition, issued by Sheet Metal and Air Conditioning Contractors National Association (SMACNA) insofar as they are applicable for all metals.

K. ELECTROLYTIC AND CORROSIVE ACTION

Protect adjacent dissimilar metals from electrolytic action by adequate coating.

2 PRODUCTS

A. MATERIALS

1. Galvanized Iron or Steel Sheet:

ASTM A525; 1.25 oz. per sq. ft. coating; No. 24 U.S. Standard gauge, or as recommended in Standard Specification for exact condition.

2. Sheet Aluminum:

3105 Alloy for flashings; 3003 alloy elsewhere. 0.040-inch thickness unless other thickness is indicated on drawings or specified.

3. Lead:

Fed. Spec. QQ-L-201a.

4. Solder:

For aluminum, as recommended by aluminum manufacturer.

For all other materials, ASTM B32, 50% tin, 50% lead.

5. Nails, Rivets, and Fasteners:

Use only soft iron rivets having rust-resistive coating, galvanized nails, and cadmium plated screws and washers in connection with galvanized iron and steel.

6. Other Materials:

All other materials, not specifically described but required for a complete and proper installation of flashing and sheet metal, shall be new, first quality of their respective kinds, and subject to the prior approval of the Architect.

3 EXECUTION

A. FLASHING, GENERAL

Provide flashings of material as noted or specified.

Where not otherwise indicated and where noted "Sheet metal", provide galvanized steel.

Conceal fastenings wherever practicable.

Corner shop-formed, extending not less than one foot each side of corner.

B. SURFACE CONDITIONS

1. Inspection:

a. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

b. Verify that flashing and sheet metal may be installed in accordance with the original design, all pertinent codes and regulations, the referenced standards, and the approved Shop Drawings.

2. Discrepancies:

a. In the event of discrepancy, immediately notify the Architect.

b. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

C. WORKMANSHIP

1. General:

Form all sheet metal accurately to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.

Unless otherwise specifically permitted by the Architect, turn all exposed edges back one-half inch.

2. Expansion:

Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished Work.

3. Weatherproofing:

Finish watertight and weathertight where so required.

Make all lock seam work flat and true to line, and sweated full of solder.

Make all lock seams and lap seams, when soldered, at least one-half inch wide.

Where lap seams are not soldered, lap according to pitch but in no case less than three inches.

Make all flat and lap seams in direction of flow.

4. Joints:

Join parts with rivets or sheet metal screws where necessary for strength or stiffness.

Provide suitable watertight expansion joints for all runs of more than 40 feet except where closer spacing is indicated on the Drawings or required for proper installation.

Provide standing seams as noted and detailed on drawings for copings and parapet wall counterflashings.

5. Fastening:

Whenever possible, secure metal by means of clips or cleats without nailing through the metal.

In general, space all nails, rivets, and screws not more than eight inches apart and, where exposed to the weather, use lead washers.

For nailing into wood, use barbed roofing nails 1-1/4 inches long by eleven gauge. Only concealed nailing will be allowed for fastening.

Exposed fastening shall be by screws and washers thru slotted holes @ 2'-0" o.c. per referenced standards.

Exposed nailing WILL NOT be allowed.

D. SOLDERING

1. General:

Thoroughly clean and tin all joint materials prior to soldering.

Perform all soldering slowly with a well-heated copper in order to heat the seams thoroughly and to completely fill them with solder.

Perform all soldering with a heavy soldering copper of blunt design, properly tinned for use.

Make all exposed soldering on finished surfaces neat, full flowing, and smooth.

2. Cleaning:

After soldering, thoroughly wash acid flux with a soda solution.

END OF SECTION

1 GENERAL

A. GENERAL REQUIREMENTS

Conform to the provisions of Part I and DIVISION 1.

B. GUARANTEE

Provide a written guarantee based on model form in Section 01700 warranting caulking to be free of all defects in materials and workmanship for a period of 3 years from date of acceptance of building. Signed by subcontractor and countersigned by General Contractor. Leakage, hardening, staining, separation, crumbling, running, melting will be considered defects; replace all defective caulking at no cost to Owner. Submit as indicated in Section 01700.

C. DELIVERY

Deliver in manufacturer's original sealed containers.

D. SUBMITTALS

1. Product Data:

After award of Contract, and before caulking materials are delivered to the site, submit manufacturers' published literature for specified products and accessories as applicable, including manufacturers' specifications, physical characteristics and performance data. Submit as a supplement, manufacturers' instructions and directions for application if not included in manufacturers' published literature. Submit in accordance with Section 01340.

2. MSDS Submittals:

Within 20 days after award of Contract, and before any materials are delivered to the site, Material Safety Data Sheets (MSDS) shall be submitted on all materials/products that contain or use chemical solution for treatment or as additives and/or display Hazardous/Warning/Caution information in their products literature or on their labels.

2 PRODUCTS

A. ELASTOMER SEALANTS

1. Polyurethane: High-grade urethane-based product such as BASF Sonolastic NP-1 or approved. Sealant in contact with single ply roof membrane shall be approved by the manufacturer.

2. Color: As selected by Architect.

B. PRIMERS

Use primers as required by manufacturers.

C. BACKING

Nomaco Sof-Rod or approved

3 EXECUTION

A. CAULKING WITH ELASTOMER SEALANTS

All exterior joints and all joints marked "sealant" except those included under another section.

1. Use polyurethane sealant for sheet metal flashing and coping.

2. Use Manufacturer approved sealant where in contact with single ply membrane.

3. Depth of sealant not less than joint width.

B. JOINT PREPARATION

1. Concrete Surfaces:

Sandblast or rough brush to remove all dust, dirt, grease and other foreign matter.

2. Metal and Glass:

Use an oil-free solvent. Take care not to contaminate solvent supply. Use "progressing cleaning" method; i.e., wipe surface to be cleaned with solvent-soaked clean cloth and immediately wipe dry with dry cloth.

C. APPLICATION

Install backing rod at all locations. All materials are to be installed by skilled workmen in the following manner: Place nozzle of the gun at bottom of the joint and completely fill from the bottom so that sealant or caulking compound is extruded into the joint without the entrapment of air. Tool joint so that sealant or caulking compound is pressed into the joint and wetting of the joint interface is assured. Protect adjacent surfaces which are not to receive sealant or caulking compound by use of masking tape. Tape shall be removed immediately after sealant is applied, leaving a clean, sharp line.

D. PROTECTION

Protect all caulked joints for at least 24 hours. Protect from dust, moisture, and other harmful substances during installation.

E. CLEANING

Clean adjacent surfaces free of sealant and caulking compound or soiling; clean as work progresses. Use solvent or cleaning agent as recommended by manufacturer of sealant or caulking compound. Do not scratch or otherwise damage visible surfaces. Do not allow silicone sealants to touch glass surfaces; all glass touched by silicone shall be replaced with clean glass.

END OF SECTION