

SECTION 01110
SUMMARY OF WORK

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this Section.

1.2 SUMMARY

- A. Section includes removal and disposal of the existing roofing systems, coping, insulation, flashings, and all construction related debris. Installation of a new modified bituminous roofing system as specified with all applicable details for a complete watertight warranted roofing assembly per the manufacturers instructions.
- B. Materials specified in section 01 64 00 Owner Furnished Contractor Installed (O.F.C.I.) will be the responsibility of the contractor to receive, store, protect, and maintain in good condition throughout the course of the project.
- C. Related Work Specified Elsewhere:
 - 1. Section 01 - Owner Furnished Contractor Installed
 - 2. Section 06 - Rough Carpentry
 - 3. Section 07: Modified Built-up Roofing
 - 4. Section 07: Coping System
 - 5. Section 07: Sheet Metal Flashing and Trim
 - 6. Section 09: Elastomeric Acrylic Wall Coating

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Project Identification: MSHS Ag Engineering Re-Roof Project
- B. Project Locations: Madera South High School 705 W. Pecan Ave. Madera, CA 93637
- C. Owner: Madera Unified School District 1205 S. Madera Ave. Madera, CA 93637
- D. General scope of work but not limited to;
 - 1. MSHS Ag Engineering Low Slope Roof Area:
 - 2. Includes removal and disposal of existing roofing system(s), insulation board, gutters, flashings, copings, etc. for a complete prepared roof surface.
 - 3. Acoustical insulation is to remain in place and be reused. Debris will need to be cleaned from the steel deck flutes prior to installation of the new roofing systems.
 - 4. Remove all reglet counter-flashing & skirt flashing, save for re-installation. Damaged items shall be replaced with new matching the existing type and size. Reinstall all skirt flashing and reglet counter-flashing once the project is complete.

5. Remove the ductwork extensions and associated flashing, set aside for re-installation. Reinstall all ductwork once the project is complete, seal all duct work seams with Uni-Bond ST. Paint all of the duct work with Pyramic Acrylic Coating.
6. Install two layers of 2.6 polyiso insulation board, stagger all seams, mechanically attach with screws and plates, 16 fasteners per 4'x8' sheet.
7. Install tapered insulation crickets at all existing locations and as needed for proper slope to drain in insulation adhesive. Submit a taper cricket plan to the district for approval prior to starting the work.
8. Install one layer of 1/2" wood fiber 6 side primed insulation board in Insul-Lock insulation adhesive per ASCE 7-10 wind uplift calculations.
9. Install 4lb lead flashings with factory lead top counter-flashing. All electrical penetrations are to have a lead bonnet banded and caulked.
10. Install one layer of Stressbase 80 ply sheet in specified adhesive, trim all T joints.
11. Install one layer of Stressply Plus FR Mineral cap sheet in specified adhesive, trim all T joints.
12. Apply Pyramic base coat to the entire roof / base flashing surface, pipe penetrations, vents, etc. at a rate of 1.5 gallons per 100 sq ft and back roll the entire application.
13. Apply Pyramic top coat to the entire roof / base flashing surface, pipe penetrations, vents, etc. in a cross hatch pattern to the base coat at a rate of 1.5 gallons per 100 sq ft and back roll the entire application. Ensure complete coverage, additional coats may be needed for complete uniform coverage.
14. Install Tuff Stuff Urethane Sealant to all lead counter flashing at the wall support curbs.
15. Install Pyramic base / top coat to the wall support curb pans, lead flashings, and lead counter flashing, and new Tuff Stuff sealant.
16. Allow all mastic and roof work to properly cure prior to the application of the roof coating. Approximately 30 days.
17. Install 3'x4' VPG Trafguard walk pads around all sides of all HVAC mechanical equipment and roof hatches. Adhere to the roof deck with VPG walked adhesive.
18. Pressure wash and scrape debris from all of the interior block walls.
19. Install Tuff Stuff Urethane around all of the wall support brackets.
20. Install Tuff Coat elastomeric coating base coat at 1 gallon per 100 sq. ft, allow to dry completely.
21. Install Tuff Coat elastomeric coating top coat at 1 gallon per 100 sq. ft to all interior block wall surfaces.

1.4 WORK COMPLETED BY THE DISTRICT

- A. No work will be completed by the district.

1.5 TYPE OF CONTRACT

- A. Work will be completed under a single prime contract.
- B. Owner Supplied Contractor Installed (O.F.C.I.). Materials will be clearly noted at the back of each specification section as to what is being supplied by the owner. All O.F.C.I. materials are to be

installed as part of this contract by the contractor. All other materials needed to complete this scope of work and are not specifically listed in the owner supplied materials section will be the responsibility of the contractor to supply and install.

1.6 USE OF PREMISES

- A. General: Contractor will have limited use of premises for construction operations.
- B. Use of site: Limit use of premises to work areas required. Do not disturb portions of the project site beyond areas in which the work is indicated.
- C. The building interior is off limits to the contractor. All access shall be from the exterior.
- D. The point of exterior access must be approved by the owner.
- E. Entrances: Keep all entrances serving the building clear and available to the owner, owner's employees, and emergency vehicles.
- F. Use of existing building: Maintain existing building in a weather tight condition throughout the construction period. Repair damage caused by construction operations. Protect building and occupants during construction.
- G. Vehicle Parking: Contractor parking is available on site and will need to be approved by the owner.
- H. Assume full responsibility for protection and safekeeping of materials stored on premises. Coordinate the location of materials and equipment to be stored on premises. Provide barricades, barriers, and enclosures as required to ensure safety.

1.7 OWNERS OCCUPANCY REQUIREMENTS

- A. The owner will occupy the building during the entire construction phase. Cooperate with the owner during construction operations to minimize owner conflicts and facilitate owner usage. Perform the work as to not interfere with owners operations.
- B. A minimum of 72 hours notice is needed for all activities that will affect the owners operations.

1.8 WORK RESTRICTIONS

- A. On site work hours: Work shall generally be performed from the hours of 7:00 am – 5:00 pm Monday through Friday except as otherwise indicated or approved by the owner.
- B. Weekend hours, early morning hours, utility shut down, and noisy activity requires owner's authorization a minimum of 72 hours in advance.

1.9 UNIT PRICES

- A. The following unit prices will be used to add or deduct from the total contract amount.

- 1. Replacement of steel roof decking

10. SCHEDULE OF ALTERNATES

- A. None

1.11 PROJECT CONDITIONS

- A. Proceed with roofing work only when existing and forecasted weather conditions will permit a unit of work to be installed in accordance with manufacturer's recommendations and warranty requirements.
- B. Do not apply roofing insulation or membrane to damp deck surface.

- C. Do not expose materials subject to water or solar damage in quantities greater than can be weatherproofed during same day.

1.12 SEQUENCING AND SCHEDULING

- A. Sequence installation of roofing with related units of work specified in other sections to ensure that roof assemblies, including roof accessories, flashing, trim and joint sealers, are protected against damage from effects of weather, corrosion and adjacent construction activity.
- B. Complete all roofing field assembly work each day. Phased construction will not be accepted. Phased construction refers to the application of the roof insulation board, ply sheet membrane, and cap sheet membrane installed in the same day.
- C. Due to the cure time needed for the roofing system prior to the acrylic coating scheduling of work past the completion date will need to be reviewed. Work can only be completed during weekends or off hours unless specifically approved by the Owner.

1.13 PROJECT TIMELINE

- A. Advertised:
- B. Advertised:
- C. Pre-Bid Meeting: @ am
- D. Last Day for Questions:
- E. Bid Date: @ pm
- F. Board Meeting for Award:
- G. Project Start: June 14, 2021
- H. Project Completion: August 13, 2021

END OF SECTION 01 11 00 – SUMMARY OF WORK

**SECTION 06 10 00
ROUGH CARPENTRY**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification sections, apply to work of this section.
- B. Related work specified elsewhere:
 - 1. Division 01: Summary of Work
 - 2. Division 07: Modified Built Up Roofing
 - 3. Division 07: Coping System
 - 4. Division 07: Sheet Metal Flashing and Trim
 - 5. Division 09: Painting

1.2 SUMMARY:

- A. This portion of the specification sets forth the general requirements, including the quality and type of materials required for the installation of all pressure treated and non pressure treated lumber used for wood curbs, nailing strips, miscellaneous blocking material, unexposed fillers, fascia, edging strips, deck replacement, etc

1.3 STORAGE:

- A. All material specified herein shall be stored (after delivery to the site) so that it will be fully protected from damage and weather, and shall be stacked to prevent damage. All lumber shall be fully protected to maintain the original required moisture content as specified in item titled "Moisture Content".

1.4 OTHER REQUIREMENTS:

- A. Dimensions indicated on the drawings are nominal dimensions (except where details show actual sizes) and shall be subject to the standard reductions required for surfacing or tolerances permitted by the grading rules. Unless otherwise indicated on drawings, all material shall be S4S (surfaced four sides).

1.5 PROTECTION:

- A. All finished work shall be adequately protected against damage from any source.

1.6 COORDINATION:

- A. Carpenters shall coordinate their work with that of the other trades so that progress continues without interruption.

PART 2 - PRODUCTS

2.1 WOOD - FRAMING AND CURBS:

A. GRADING RULES, GRADES, AND SPECIES

1. Lumber: Southern Pine, yellow pine, Douglas fir, spruce, ponderosa pine, larch or Hemlock and shall meet the following minimum grade requirement of construction standard (75% #1 and 25% #2); free from warping and visible decay. Lumber shall be graded according to the standard grading rules of the Southern Pine Inspection Bureau, the West Coast Lumber Inspection Bureau, or the Western Wood Products Association.

B. MOISTURE CONTENT

1. All lumber shall be air-dried or kiln-dried before treatment, so that the moisture content is not more than 19%. After treatment, it shall be kiln-dried at temperatures not exceeding 160 degrees F. (71 degrees C) so that the moisture content is not more than 19% at time of shipment

C. DECAY-RESISTANT TREATMENT:

1. Lumber in contact with roofing or acting as fascias, and all other exterior lumber, shall be pressure-treated with a waterborne preservative in accordance with AWWA Specification P5. Creosote and oil-borne preservatives are not acceptable.
2. Treating processes, material conditions, plant equipment, and other pertinent requirements shall conform to AWWA Specifications C1 and C2 for specific kind of lumber and type of preservative to be used. Retention shall be as required for intended use.
3. All treated lumber shall bear the mark of a code recognized third party agency such as the AWWA.

D. PLYWOOD:

Grade: CDX or Cyme exterior Grade. Description: 5/8" thick

E. WOOD SIDING:

1. T 111 or approved equal.

2.2 MECHANICAL FASTENERS:

A. WOOD TO STEEL:

1. Acceptable Manufacturers:
 - a. Roofgrip screw with Climaseal coating; plastic disc - Buildex Div. of ITW, Itasca, IL.
 - b. Dekfast screw with Sentri coating: plastic disc – Construction Fasteners, Inc., Wyomissing, PA.
 - c. Fabco Fastening Systems, West Newton, PA: Insul-Fixx screw with Fabcote coating; plastic plate, Plate-Fixx screw with Fabcote coat; plastic disc.
 - d. Kwik-Deck screw with Oxyseal coating; plastic disc - Atlas Bolt & Screw Div., Trans Union Fastener Corp., Ashland, OH.

- e. Olympic #12-11 Standard Steel Deck Screw or #14-10 Heavy Duty All Purpose Screw with CR-10 coating; three inch diameter plastic - Olympic Manufacturing Group, Inc., Agawam, MA.
- f. Glasfast (plastic disc) - Owens-Corning Fiberglas Corp., Toledo, OH.
- g. Perma Fastener screw with permaseal coating; plastic plate - International Permalite, Inc., Oak Brook, IL.

2. Screw Length: Sufficient to engage steel, wood deck 1 inch.

B. WOOD TO WOOD:

- 1. Type: Galvanized, common, annular ring nail. Length: Sufficient to penetrate underlay blocking 1-1/4 inches.
- 2. Acceptable Manufacturers:
 - a. Hillwood Manufacturing Co., Cleveland, OH.
 - b. Independent Nail, Inc., Bridgewater, MA.
 - c. W.H. Maze Co., Peru, IL.
 - d. National Nail Corp., Grand Rapids, MI.

C. WOOD TO MASONRY:

- 1. Acceptable Manufacturers:
 - a. Tapcon 1/4" diameter, Phillips pan head anchor - Buildex Div. of ITW, Itasca, IL.
 - b. Confas - Construction Fasteners, Inc., Wyomissing, PA.
 - c. Con-fixx - Fabco Fastening Systems, West Newton, PA.
 - d. #14-10 Heavy Duty all Purpose Screw – Olympic Manufacturing Group, Inc., Agawam, MA.
 - e. Tru-Fast fastener (stainless steel) - The Tru-Fast Corp., Bryan, OH.
- 2. Length: Sufficient to provide 1-1/2 inch embedment.

D. WOOD TO HOLLOW MASONRY:

- 1. Acceptable Manufacturers:
 - a. Sleeve Anchor by Hilti Fastening Systems, Tulsa, OK.
 - b. Rawly Hollow Masonry Anchor by the Rawlplug Co., Inc., New Rochelle, NY.
- 2. Length: As recommended by manufacturer

PART 3 - EXECUTION

3.1 CARPENTRY:

- A. At roof edge to receive metal fascia, around all roof top penetration perimeters, and under any flashing component that is to have a roof flange mechanically fastened to roofing substrate; mechanically attach wood blocking. Blocking thickness: Equal to common 1 x 4", 1 x 6" 2x4", 2x6", 2x8", 2x10", 2x12".

- B. Fasteners shall be installed in two rows staggered. Spacing in any one row shall not exceed 24 inches. Within eight feet of outside corners, spacing shall not exceed twelve inches in any one row.
- C. Where required, offset blocking layers twelve inches, weave corners.
- D. When preservative treated wood is cut, the cut end shall be treated in accordance with AWP A Specification M4.
- E. Lumber shall be accurately cut to the work requirements and shall be well fastened.
- F. Bolted fastenings shall have washers of adequate size under both heads and nuts. Nails shall be of correct size and quantity for proper fastening. Oversized nails that will result in splitting shall not be used. All fasteners shall be galvanized per ASTM A 153.

END OF SECTION

SECTION 01 64 00

OWNER FURNISHED CONTRACTOR INSTALLED (O.F.C.I.)

PART 1 - GENERAL

1. SUMMARY

- A. DESCRIPTION: The Owner shall procure and provide certain products for installation as shown and specified per Contract Documents.
- B. RELATED WORK SPECIFIED ELSEWHERE:
 - 1. General: Products furnished and paid for by the Owner are described in the following technical sections and /or in the Drawings as O.F.C.I. materials.
 - 2. Note that this project includes the installation of owner-supplied materials as noted in this specification section only. All materials not specifically listed below will be the responsibility of the contractor to provide and install.

2. DEFINITIONS

- A. GENERAL: The following are used to identify products as noted on the Drawings.
- B. OWNER FURNISHED CONTRACTOR INSTALLED (O.F.C.I.): Products or equipment furnished by the Owner for installation under this contract.
- C. OWNER FURNISHED OWNER INSTALLED (O.F.O.I.): Products or equipment to be provided and installed by the Owner, but requiring surfacing, backing, utility connections or other preparation under this contract, for proper installation.
- D. NOT IN CONTRACT (N.I.C.): Products or equipment to be provided and installed by Owner, not requiring surfacing, backing, utility connections or other preparation under this contract.

PART 2 - PRODUCTS

1. PRODUCTS

- A. ROOFING MATERIAL FURNISHED BY OWNER (O.F.C.I.): District supplied material. Related specification sections include;
 - 1. Section 07 - Modified Bituminous Roofing
 - 2. Section 07 - Sheet Metal Flashing and Trim
- B. MATERIAL LIST
 - 1. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.

2. Any and all material or accessories required for the installation of the roof system in excess of the district provided material must be supplied and installed by the Contractor. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required. The cost to handle and break flashing metal from the District provided flat stock is contractor's responsibility.
3. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
4. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with the respective specification section.
5. Freight charges of owner supplied materials will be the responsibility of the Owner.
6. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at job site.
7. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of each respective specification section.
8. Madera South High School, Ag Engineering Building -
 - a. 100 each - Stressply Plus FR Mineral surface sheet (75 sq ft per roll)
 - b. 50 each - Stressbase 80 Base Sheet (150 sq ft per roll)
 - c. 2 each - Garla Prime VOC (5 gallon pail)
 - d. 20 each - Flashing Bond Mastic (5 gal pail)
 - e. 5 each - Weatherking Plus WC 55 gallon drum
 - f. 30 each - Tuff Stuff Urethane Sealant (10.1 oz tube, white)
 - g. 3 each - Garmesh (150 'x 6" roll)
 - h. 4 each - Pyramic Plus Lo Acrylic Coating (55 gallon drum)
 - i. 10 each - Uni Bond ST, 4" x50' rl
 - j. 12 each - Insul-Lock Insulation Adhesive
 - k. 1 each - 1/8" rivets - colored to match, 250 per bag
 - l. 100 each - VPG Trafguard Walk Pad 3'x4'
 - m. 100 each - VPG Trafguard Walk Pad Adhesive 10 oz tube
 - n. 13 each - Tuff Coat Wall Coating, 5 gallon pail
 - o. 310 feet - R-Mer Coping System
 - p. 4 each - Miters
 - q. 2 each - End Caps
 - r. 1 each - Freight to the Job Site

PART 3 - EXECUTION

1. OWNER'S RESPONSIBILITIES

- A. SUBMITTALS: Arrange for and deliver necessary shop drawings, product data and samples to Contractor.

B. DELIVERY:

1. General: Arrange and pay for product delivery to the site, in accordance with construction schedule.
2. Bill of Materials: Deliver supplier's documentation to Contractor.
3. Inspection: Inspect jointly with Contractor.
4. Claims: Submit for transportation damage and replacement of otherwise damaged, defective, or missing items.

C. GUARANTEES: Arrange for manufacturer's warranties, bonds, service, inspections, as required.

2. CONTRACTOR'S RESPONSIBILITIES

A. SUBMITTALS: Review shop drawings, product data and samples and submit to Architect and/ or Owner with notification of any discrepancies or problems anticipated in use of product.

B. DELIVERY:

1. General: Designate delivery date for each product in Progress Schedule.
2. Receiving: Receive and unload products at site. Handle products at the site, including un-crating, protection, and storage.
3. Inspection: Promptly inspect products jointly with Owner; record shortages, damaged or defective items. Shortages and/or damage must be noted at the time of delivery by the contractor no claims may be made after the fact.
4. Storage: Protect products from damage or exposure to elements per the manufactures requirements.

C. INSTALLATION:

1. General: Assemble, install, connect, adjust and finish products, as stipulated in the respective section of Specifications.
2. Repair and Replacement: Items damaged during handling and installation.
3. Install all O.F.C.I. products per the specifications and manufacturer instructions.
4. All products not supplied by the owner are the responsibility of the contractor to supply and install per manufacturers instructions.

END OF SECTION

**SECTION 01 30 00
SUBMITTALS**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Contract General Conditions.
- B. See also contract general conditions for additional requirements especially those regarding requests for ALTERNATIVES OR EQUALS and for SUBSTITUTIONS.

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:
 - 1. Contractor's construction schedule
 - 2. Submittal schedule
 - 3. Shop Drawings
 - 4. Product Data
 - 5. Samples.
- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:
 - 1. Permits
 - 2. Applications for payment
 - 3. Performance and payment bonds
 - 4. Insurance certificates
 - 5. List of Subcontractors.

1.03 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Architect shall return without action any submittals requiring coordination with other submittals until related submittals are coordinated.
 - 3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
 - a. See General Conditions and Supplementary General Conditions for additional requirements.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to

permit processing.

- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken:
 - a. Project name
 - b. Date
 - c. Name and address of Architect
 - d. Name and address of Contractor
 - e. Name and address of subcontractor
 - f. Name and address of supplier
 - g. Name of manufacturer
 - h. Number and title of appropriate Specification Section
 - i. Drawing number and detail references, as appropriate.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

On the transmittal Record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

1.05 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
- Dimensions
Identification of products and materials included
Compliance with specified standards
Notation of coordination requirements
Notation of dimensions established by field measurement.
- C. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 30" x 42".
- D. Submittals: Submit one correctable translucent reproducible print and six (6) blue- or black-line print for the Architect's review; the reproducible and one print will be returned.

Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.06 PRODUCT DATA

- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
 - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - Manufacturer's printed recommendations,
 - Compliance with recognized trade association standards,
 - Compliance with recognized testing agency standards,
 - Application of testing agency labels and seals,
 - Notation of dimensions verified by field measurement,
 - Notation of coordination requirements.
 - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
- B. Submittals: Submit a minimum of six (6) copies of each required submittal as well as additional copies as required by the Architect, (the actual number of submittals and distribution required shall be determined by the Trustees Representative at the Preconstruction Conference). The Architect will return two sets marked with action taken and corrections or modifications required.
- C. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities.
 - 1. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
 - 2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.07 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
 - 1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to include the following:
 - Generic description of the Sample
 - Sample source
 - Product name or name of manufacturer
 - Compliance with recognized standards
 - Availability and delivery time.
 - 2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these

characteristics between the final submittal and the actual component as delivered and installed.

- B. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

Preliminary submittals will be reviewed and returned with the Architect's mark indicating selection and other action.

- C. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.

Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

- D. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work.

Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.

1.08 ARCHITECTS ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly.

Compliance with specified characteristics is the Contractor's responsibility.

- B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "Approved," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
2. Final-But-Restricted Release: When submittals are marked "Approved as Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
3. Returned for Resubmittal: When submittal is marked "Not Approved, Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

- b. Note: Any work performed prior to receiving a FULLY APPROVED

submittal shall be done at the contractors own risk and is subject to being replaced if any of the submittal requirements are not met.

PART 2 – PRODUCTS NOT USED

PART 3 – EXECUTION NOT USED

END OF SECTION 01300

SECTION 07 22 00

ROOF DECK AND INSULATION

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

2. SUMMARY

- A. Section includes roof insulation over the properly prepared deck substrate.
- B. Related Sections:
 - 1. Section 07 05 00 – Common Work Procedures for Thermal and Moisture Protection
 - 2. Section 07 55 00 – Modified Bitumen Roofing
 - 3. Section 07 62 00 – Sheet Metal Flashing and Trim

3. REFERENCES

- A. American Society for Testing and materials (ASTM):
 - 1. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium Nickel Steel Plate, Sheet and Strip.
 - 2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - 3. ASTM B29 Standard Specification for Refined Lead.
 - 4. ASTM B32 Standard Specification for Solder Metal.
 - 5. ASTM C165 Standard Test Method for Measuring Compressive Properties of Thermal Insulation.
 - 6. ASTM C208 Standard Specification for Cellulosic Fiber Insulation Board.
 - 7. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board.
 - 8. ASTM C272 Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions.
 - 9. ASTM C1396 Standard Specification for Gypsum Wallboard.
 - 10. ASTM C518 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 11. ASTM C578 Standard Specification for Perlite Thermal Insulation Board.
 - 12. ASTM C728 Standard Test Methods for Fire Test of Roof Coverings.
 - 13. ASTM C1289 Standard Specification for Faced Rigid Polyisocyanurate Thermal Insulation.
 - 14. ASTM D5 Standard Test Method for Penetration of Bituminous Materials.
 - 15. ASTM D36 Standard Test Method for Softening Point of Bitumen (Ring and Ball Apparatus).
 - 16. ASTM D312 Standard Specification for Asphalt Used in Roofing.
 - 17. ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 - 18. ASTM D1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 19. ASTM D1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics.

- 20. ASTM D2126 Standard Test Method for Response off Rigid Cellular Plastics to Thermal Humid Aging.
- 21. ASTM D2178 Standard Specification for Asphalt Glass Felts used in Roofing and Waterproofing.
- 22. ASTM D4601 Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
- 23. ASTM D5147 Standard Sampling and Testing Modified Bituminous Sheet Material.
- B. Cast Iron Soil Pipe Institute, Washington, D.C. (CISPI)
- C. Factory Mutual Research (FM):
 - 1. Roof Assembly Classifications.
- D. National Roofing Contractors Association (NRCA):
 - 1. Roofing and Waterproofing Manual.
- E. Underwriters Laboratories, Inc. (UL):
 - 1. Fire Hazard Classifications.
- F. Warnock Hersey (WH):
 - 1. Fire Hazard Classifications.
- G. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- H. Steel Deck Institute, St. Louis, Missouri (SDI)
- I. Southern Pine Inspection Bureau, Pensacola, Florida (SPIB)
- J. Insulation Board, Polyisocyanurate (FS HH-I-1972)
- K. Insulation Board, Thermal (Fiberboard) (FS LLL-1-535B)

1.4. SUBMITTALS

- A. Product Data: Provide manufacturer's specification data sheets for each product in accordance with Division 01 Section Submittal Procedures. 013000.
- B. Provide approval letters from insulation manufacturer for use of their insulation within this particular roofing system type.
- C. Provide a sample of each insulation type.
- D. Shop Drawings
 - 1. Submit manufacturer's shop drawings indicating complete installation details of tapered insulation system, tapered insulation crickets, including identification of each insulation block, sequence of installation, layout, drain locations, roof slopes, thicknesses, crickets and saddles.
 - 2. Shop drawing shall include: Outline of roof, location of drains, a complete board layout of tapered insulation components, thickness and the average "R" value for the completed insulation system.
- E. Certification
 - 1. Submit roof manufacturer's certification that insulation fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that insulation furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.5. QUALITY ASSURANCE

- A. Fire Classification, ASTM E-108.
- B. Manufacturer's Certificate: Certify that roof system furnished is approved by Factory Mutual, Underwriters Laboratories, Warnock Hersey or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- C. Manufacturer's Certificate: Certify that the roof system is adhered properly to meet or exceed the requirements of FM 1-90.
- D. Pre-installation meeting: Refer to Division 07 roofing specifications for pre-installation meeting requirements.

1.6. DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site with seals and labels intact, in manufacturer's original containers, dry and undamaged.
- B. Store all insulation materials in a manner to protect them from the wind, sun and moisture damage prior to and during installation. Any insulation that has been exposed to any moisture shall be removed from the project site.
- C. Keep materials enclosed in a watertight, ventilated enclosure (i.e. tarpaulins).
- D. Store materials off the ground. Any warped, broken or wet insulation boards shall be removed from the site.

PART 2 – PRODUCTS

2.1. PRODUCTS, GENERAL

- A. Refer to Division 01 Section "Common Product Requirements."
- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.
- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
 - 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.
 - 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
 - 3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2. INSULATION MATERIALS

- A. Thermal Insulation Properties and Approved Insulation Boards.
 1. Rigid Polyisocyanurate Roof Insulation; ASTM C1289:
 - a. Qualities: Rigid, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
 - b. Thickness: 5.2" (two layers of 2.6")
 - c. R-Value: 30
 - d. Attachment: Mechanically attached per roofing manufactures ASCE 7-16 Wind Uplift requirements.
 - e. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1.
 - f. Acceptable Products:
 - 1) ENRGY-3; Johns Manville
 - 2) H-Shield; Hunter
 - 3) EnergyGuard; GAF
 - 4) Approved Equivalent
 2. Tapered Polyisocyanurate Roof Insulation; ASTM C1289:
 - a. Qualities: Factory Tapered, closed cell polyisocyanurate foam core bonded to heavy duty glass fiber mat facers.
 - b. Thickness: 1" per foot slope to drain
 - c. Average R-Value: 30
 - d. Tapered Slope:
 - e. Attachment: Mechanically or adhesive attached per roofing manufactures ASCE 7-16 Wind Uplift requirements.
 - f. Compliances: UL, WH or FM listed under Roofing Systems Federal Specification HH-I-1972, Class 1
 - g. Acceptable Products:
 - 1) ENRGY 3; Johns Manville
 - 2) EnergyGuard; GAF
 - 3) H-Shield; Hunter
 - 4) Approved Equivalent
 3. High Density Six Side Primed Fiberboard Roof insulation; ASTM C208
 - a. Qualities: Rigid, composed of interlocking fibers factory blended treated with asphalt on six sides.
 - b. Board Size: Four feet by Eight feet (4' x 8')
 - c. Thickness: 1/2"
 - d. Attachment: Attached in adhesive per roofing manufactures ASCE 7-16 Wind Uplift requirements.
 - e. Compliances: UL, WH, FM listed under Roofing Systems. Federal Specification LLL-I-535-B.
 - f. Acceptable Manufacturers:
 - 1) Blue Ridge; Celotex
 - 2) Temple Inland
 - 3) GAF Building Materials Corporation
 - 4) Georgia-Pacific
 - 5) Approved Equivalent

4. Dens-Deck Prime Roof Board
 - a. Qualities: Nonstructural glass mat faced, noncombustible, water-resistant treated gypsum core panel.
 - b. Board Size: Four feet by Eight feet (4'x8').
 - c. Thickness: **N/A**
 - d. R-Value:
 - e. Attachment: Mechanically attached per roofing manufacturers ASCE 7-16 wind uplift requirements.
 - f. Compliances: UL, WH or FM listed under Roofing Systems.

2.3. RELATED MATERIALS

- A. Fiber Cant and Tapered Edge Strips: Performed rigid insulation units of sizes/shapes indicated, matching insulation board or of perlite or organic fiberboard, as per the approved manufacturer.
 1. Acceptable Manufacturers:
 - a. The Garland Company, Inc.
 - b. Celotex
 - c. Johns Manville
 - d. GAF
 - e. Approved Equivalent
- B. Protection Board: Pre-molded semi-rigid asphalt composition board one half (1/2) inch.
- C. Roof Board Joint Tape: Six (6) inches wide glass fiber mat with adhesive compatible with insulation board facers.
- D. Asphalt: ASTM D312, Type III Steep Asphalt.
- E. Roof Deck Insulation Adhesive: Insul-Lock HR - Dual-component, high rise foam adhesive with 45% rapidly renewable material content as recommended by insulation manufacturer and approved by FM indicated ratings.
 1. Tensile Strength (ASTM D412).....250 psi
 2. Density (ASTM D1875).....8.5 lbs./gal.
 3. Viscosity (ASTM D2556).....22,000 to 60,000 cP.
 4. 2 "Peel Strength (ASTM D903).....17 lb/in.
 5. 3 "Flexibility (ASTM D816).....Pass @ -70°F
- F. Fasteners: Corrosion resistant screw fastener as recommended by roof membrane manufacturer.
 1. Factory Mutual Tested and Approved with three (3) inches coated disc for I-90 rating, length required to penetrate metal deck one inch.
 2. Screws: Concealor #14-13 DP1 as specified per ASCE 7 calculations.

PART 3 – EXECUTION

1. EXECUTION, GENERAL

- A. Comply with requirements of Division 01 Section "Common Execution Requirements."

2. INSPECTOR OF SURFACES

- A. Roofing contractor shall be responsible for preparing an adequate substrate to receive insulation.
 - 1. Verify that work which penetrates roof deck has been completed.
 - 2. Verify that wood nailers are properly and securely installed.
 - 3. Examine surfaces for defects, rough spots, ridges, depressions, foreign material, moisture, and unevenness.
 - 4. Do not proceed until defects are corrected.
 - 5. Do not apply insulation until substrate is sufficiently dry.
 - 6. Broom clean substrate immediately prior to application.
 - 7. Use additional insulation to fill depressions and low spots that would otherwise cause ponding water.
 - 8. Verify that temporary roof has been completed.

3. INSTALLATION

- A. Comply with built-up roofing manufacturer's written instructions, as submitted and reviewed by Architect during the submittal process, for installing roof insulation.
- B. Install one lapped rosin sheet course and mechanically fasten to substrate according to built-up roofing manufacturer's written instructions and as called for in these specifications and on the drawings.
- C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- D. Install tapered insulation under area of roofing to conform to slopes indicated. 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 with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of the roof.
 - a. Field: 16 screws per 4 foot by 8 foot panel (2 square feet per screw).
 - b. Perimeter: 24 screws per 4 foot by 8 foot panel (1.33 square feet per screw).
 - c. Corners: 32 screws per 4 foot by 8 foot panel (1 square foot per screw).

2. Set each subsequent layer of insulation in insulation adhesive adhered per the roofing system manufactures recommendations.
- H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck. Tape joints if required by roofing manufacturer.
 - I. Apply insulation adhesive to underside and immediately bond cover board to substrate.
 - J. Approved insulation board shall be fully attached to the deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with manufacturer's recommendation ASCE 7-16. Otherwise, a minimum of one fastener per two square feet shall be installed.
 - K. Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than four square feet.
 - L. Spacing pattern of fasteners shall be as per manufacturer's recommendations to meet the ASCE 7-16 requirements. Placement of any fastener from edge of insulation board shall be a minimum of three inches, and a maximum of six (6) inches.
 - M. Minimum penetration into deck shall be as recommended by the fastener manufacturer. There is a one (1) inch minimum for metal, wood and structural concrete decks where not specified by the manufacturer. For gypsum and cement-wood fiber decks, penetration shall be determined from pull-out test results with a minimum penetration of one and one-half (1 ½) inches.
 - N. Gypsum and cementitious wood fiber decks: Where the roof deck is visible from the building interior, the contractor shall ensure no penetration of fasteners through underside of the deck. Any holes or spalling caused by fastener installation shall be repaired by the roofing contractor. Where the new roof system thickness exceeds an amount so that a minimum of 1 ½ of penetration cannot be achieved with an Olympic TB Fastener, or approved equivalent, then (and only then) toggle bolts may be used to secure installation to the deck.
 - O. Tape joints of insulation as per manufacturer's requirements.
 - P. Attachment with Insulation Adhesive Approved by Factory Mutual (FM).
 - Q. Ensure all surfaces are clean, dry, free of dirt, debris, oils, loose ore embedded gravel, unadhered coatings, deteriorated membrane and other contaminants that may inhibit adhesion.
 - R. Apply insulation adhesive directly to the substrate using a ribbon pattern with one quarter to one half (1/4-1/2) inch wide beads 12 inches o.c., using either the manual applicator or an automatic applicator, at a rate of one (1) gallon per one hundred (150) square feet per cartridge.
 - S. Immediately place insulation boards into wet adhesive. Do not slide boards into place. Do not allow the adhesive to skin over before installing insulation boards.

- T. Briefly step each board into place to ensure contact with the adhesive. Substrates with irregular surfaces may prevent the insulation board from making positive contact with the adhesive. Relief cuts or temporary weights may be required to ensure proper contact.
- U. All boards shall be cut and fitted where the roof deck intersects a vertical surface. The boards shall be cut to fit a minimum of one quarter (1/4) inch away from the vertical surface.
- V. Tape joints of insulation as per manufacturer's requirements.

4. CLEANING

- A. Remove debris and cartons from roof deck. Leave insulation clean and dry, ready to receive roofing membrane.

5. CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated during installation. Comply with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 07 55 00
MODIFIED BITUMINOUS MEMBRANE ROOFING

1.GENERAL

1.1. SECTION INCLUDES

- A. Includes all labor, materials, and equipment to install a modified bitumen roof system over the properly prepared substrate.
- B. Includes a new cold applied 2-ply asphalt roofing system with all accessories as needed for a complete warrantable roofing system.

1.2. RELATED SECTIONS

- A. Section 061000 - Rough Carpentry
- B. Section 072200 - Insulation Board
- C. Section 074100 - Metal Roofing System
- D. Section 076200 - Sheet Metal Flashing and Trim
- E. Section 076201 - Coping System
- F. Section 077100 - Manufactured Roof Specialties
- G. Section 077240 - Roof Hatches

1.3. REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.
- E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- F. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
- G. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- H. ASTM D 2822 Standard Specification for Asphalt Roof Cement.
- I. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- J. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet

Materials.

- K. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- L. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- M. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- N. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- O. Factory Mutual Research (FM): Roof Assembly Classifications.
- P. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- Q. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- R. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- S. Warnock Hersey (WH): Fire Hazard Classifications.
- T. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- U. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- V. UL - Fire Resistance Directory.
- W. FM Approvals - Roof Coverings and/or RoofNav assembly database.
- X. California Title 24 Energy Efficient Standards.

1.4. DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
 - 1. Factory Mutual Class A Rating.
 - 2. Underwriters Laboratory Class A Rating.
 - 3. Warnock Hersey Class A Rating.
- C. Design Requirements: Submit calculations from manufacturers engineering department prior to the start of the project. All items below must be addressed per ASCE 7-16 and approved as part of the submittal package specific to the geographical location of this project.
 - 1. Uniform Wind Uplift Load Capacity
 - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
 - 1. Design Code: ASCE 7-16, Method 2 for Components and Cladding.
 - 2. Importance Category:
 - a. III
 - 3. Importance Factor of:

- a. 1.0
 - 4. Wind Speed: 120 mph
 - 5. Ultimate Pullout Value: 540 pounds per each of the fastener
 - 6. Exposure Category:
 - a. C.
 - 7. Design Roof Height: 20 feet.
 - 8. Minimum Building Width: 30 feet.
 - 9. Roof Pitch: 1/4 :12.
 - 10. Roof Area Design Uplift Pressure:
 - a. Zone 1 - Field of roof 20 psf
 - b. Zone 2 - Eaves, ridges, hips and rakes 33.6 psf
 - c. Zone 3 - Corners 33.6 psf
 - 2. Snow Load: N/A psf.
 - 3. Live Load: 20 psf, or not to exceed original building design.
 - 4. Dead Load:
 - a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.
- D. Energy Star: Roof System shall comply with the initial and aged reflectivity required by the U.S. Federal Government's Energy Star program.
- E. LEED: Roof system shall meet the reflectivity and emissivity criteria to qualify for one point under the LEED credit category, Credit 7.2, Landscape & Exterior Design to Reduce Heat Island - Roof.
- F. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.
- G. Roof system shall have been tested in compliance with the following codes and test requirements: Submit all supporting data as noted below prior to the start of the project.
- 1. Miami-Dade County:
 - a. Torch and Mop Membrane Systems Over
 - 1. Steel Decks N.O.A.
 - b. Roofing Underlayments
 - 1. Garland Underlayments N.O.A.
 - c. Roofing Cements and Coatings
 - 1. Garland Coatings and Mastics N.O.A.
 - 2. Cool Roof Rating Council:
 - a. CRRC Directory: CRRC 0700-0028
 - 3. Underwriters Laboratories:
 - a. Certification: 11040005 / 11040025
 - 4. Warnock Hersey
 - a. ITS Directory of Listed Products
 - 5. FM Approvals:
 - a. RoofNav Website

1.5. SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening

patterns of insulation and base modified bitumen membrane, prior to job start.

- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7-16 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins. Report shall be signed and sealed by a Professional Engineer registered in the State of the Project who has provided roof system attachment analysis for not less than 5 consecutive years.
- E. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials
- F. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Provide written certification from the roofing system manufacturer certifying the applicator is currently authorized to install the specified roof system and ability to provide the specified warranty.
- H. Sample Warranty: Provide an unexecuted copy of the warranty specified for this project clearly stating the terms required of the owner, contractor, and manufacturer.
- I. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- J. Inspection Certification: Submit a letter signed by an officer of the manufacturer certifying that the manufacture will provide weekly project inspections throughout the course of construction.
- K. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.
- L. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- M. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.6. QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.

- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7. PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 - 1. Record minutes of the conference and provide copies to all parties present.
 - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Owner and Architect.

1.8. DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9. COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.10. PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.11. WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed NDL Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installing contractor, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition.
 - 1. Warranty Period:
 - a. 30 years from date of acceptance.
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 3 years from date of acceptance.

2.PRODUCTS

2.1. MANUFACTURERS

- A. Acceptable Manufacturer: The Garland Company, Inc.; 3800 E. 91st St., Cleveland, OH 44105. Local Representative: Richard Jones Phone: (559) 647-1196.
rjones@garlandind.com Web Site: www.garlandco.com.
- B. Requests for substitutions will not be considered for this project. District Standard.

2.2. COLD APPLIED 2-PLY ROOF SYSTEM

- A. Insulation Base Layers:
 - 1. Polyisocyanurate roof board insulation. Install in multiple layers staggering all seams per manufactures details. Install with mechanical fasteners per ASCE 7-16 wind uplift calculations.
 - 2. R- Value: 30, minimum thickness 5.2"
- B. Insulation Top Layer:
 - 1. One layer of six side primed ½" woodfiber insulation board. Install in insulation adhesive per ASCE 7-16 wind uplift requirements.
- C. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. StressBase 80:
- D. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. StressPly Plus FR Mineral:
- E. Interply Adhesive:
 - 1. Weatherking Plus WC:
- F. Flashing Base Ply: One ply bonded to the prepared substrate with Flashing Ply Adhesive:
 - 1. StressBase 80:
- G. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Flashing Ply Adhesive:
 - 1. StressPly Plus FR Mineral:
- H. Flashing Ply Adhesive:
 - 1. Flashing Bond Flashing Adhesive:

- I. Surfacing:
 - 1. Pyramic Plus Lo Acrylic Coating

2.3. ACCESSORIES:

- A. Roof Insulation Base Layer(s): Provide roof insulation as specified in accordance with Section 072200. (Base layer is to be mechanically attached per ASCE 7-16)
- B. Tapered Insulation System / Crickets: Per the final approved plan set slope to drain minimum 1/2" per foot.
- C. Roof Insulation Top Layer: Provide one layer of 1/2" six side primed Blue Ridge Structodek High Density Fiberboard Roof Insulation. ASTM C 208, Type II. Install in insulation adhesive.
- D. Vapor Retarder: Red Rosin Paper; Install layer rosin sheet shingled uniformly to achieve one ply over the entire prepared substrate. Shingle in direction of slope of roof to shed water on each area of roof.
 - 1. Red Rosin Paper by WR Meadows
 - a. Weight – 12 lb./roll
 - b. Size – 500 square feet p/roll
 - c. 36" wide by 167' long
- E. Nails and Fasteners: Non-ferrous metal or galvanized steel, except that hard copper nails shall be used with copper; aluminum or stainless steel nails shall be used with aluminum; and stainless steel nails shall be used with stainless steel, Fasteners shall be self-clinching type of penetrating type as recommended by the deck manufacturer. Fasten nails and fasteners flush-driven through flat metal discs not less than 1 inch (25 mm) diameter. Omit metal discs when one-piece composite nails or fasteners with heads not less than 1 inch (25 mm) diameter are used.
- F. Walkway Pads - As recommended and furnished by the membrane manufacturer set in approved adhesive to control foot traffic on roof top surface and provide a durable system compliant non-slip walkway.
 - 1. TrafGuard Roof Walkway Pads by Viking Products Group
 - a. 1/2" x 3' x 4'
 - b. In absence of a clear defined walkway plan in the project documents install walk way pads in a path from all roof access points to and around all HVAC and serviceable mechanical equipment, to and around roof hatches, and as designated by the owner.
- G. Urethane Sealant Hybrid - Tuff-Stuff MS: One part, non-sag sealant as approved and furnished by the membrane manufacturer for moving joints.
 - 1. Tensile Strength, ASTM D 412: 250 psi
 - 2. Elongation, ASTM D 412: 450%
 - 3. Hardness, Shore A ASTM C 920: 35
 - 4. Adhesion-in-Peel, ASTM C 92: 30 pli
- H. Sealant - Green-Lock Structural Adhesive: Single component, 100% solids structural adhesive as furnished and recommended by the membrane manufacturer.
 - 1. Elongation, ASTM D 412: 300%
 - 2. Hardness, Shore A, ASTM C 920: 50
 - 3. Shear Strength, ASTM D 1002: 300 psi
- I. Butyl Tape: 100% solids, asbestos free and compressive tape designed to seal as recommended and furnished by the membrane manufacturer.

- J. Glass Fiber Cant - Glass Cant: Continuous triangular cross Section made of inorganic fibrous glass used as a cant strip as recommended and furnished by the membrane manufacturer.
- K. Roof Deck Insulation Adhesive: Insul-Lock HR - Dual-component, high rise foam adhesive with 45% rapidly renewable material content as recommended by roofing manufacturer and approved by FM indicated ratings.
 - 1. Tensile Strength (ASTM D412).....250 psi
 - 2. Density (ASTM D1875).....8.5 lbs./gal.
 - 3. Viscosity (ASTM D2556).....22,000 to 60,000 cP.
 - 4. 2 `Peel Strength (ASTM D903).....17 lb/in.
 - 5. 3 `Flexibility (ASTM D816).....Pass @ -70°F

2.4. EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Pre-Manufactured Edge Metal Finishes:
 - 1. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, as shipped from the mill
 - 2. Exposed surfaces for coated panels:
 - a. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA). Provided with the following properties.
 - 1. Pencil Hardness: ASTM D3363, HB-H / NCCA II-2.
 - 2. Bend: ASTM D-4145, O-T / NCCA II-19
 - 3. Cross-Hatch Adhesion: ASTM D3359, no loss of adhesion
 - 4. Gloss (60 deg. angle): ASTM D523, 25+/-5%
 - 5. Reverse Bend: ASTM D2794, no cracking or loss of adhesion
 - 6. Nominal Thickness: ASTM D1005
- B. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- C. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- D. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- E. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled. All plumbing stacks are to have the factory lead caps / counter flashing installed. Caulking and banding will not be acceptable on open top pipe penetrations. On field fabricated flashings where a lead cap can't be applied a lead umbrella flashing is to be installed. Caulking and banding will be required with the specified sealant.
- G. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 - 1. Tensile Strength, ASTM D 412: 400 psi
 - 2. Elongation, ASTM D 412: 300%
 - 3. Density @77 deg. F 8.5 lb/gal typical

- H. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07620.
 - 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- I. Manufactured Roof Specialties: Shop fabricated copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
 - 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

3.EXECUTION

3.1. EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2. PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 - 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 - 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 - 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 - 6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
 - 7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.
 - 8. Dimensional wood deck shall be minimum 1 inch (25 mm) thick, knotholes and cracks larger than 1/4 inch shall be covered with sheet metal. All boards shall be appropriately nailed and have adequate end bearing to the centers of beams/rafters. Lumber shall be kiln dried.
 - 9. Plywood shall be a minimum 15/32 inch (11.9 mm) thick and conform to the standards and installation requirements of the American Plywood Association (APA).
 - 10. In all retrofit roof applications, it is required that deck be inspected for defects. Any defects are to be corrected per the deck manufacturer's recommendations and standards of the APA/Engineered Wood Association prior to new roof application.
 - 11. Light metal wall ties or other structural metal exposed on top of the wood deck shall be covered with one ply of a heavy roofing sheet, such as HPR Glasbase Base Sheet,

extending 2 inches to 6 inches (51 mm to 152 mm) beyond the metal in all directions. Nail in place before applying the base ply.

3.3. INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
 - 1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 - 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.4. INSULATION INSTALLATION

- A. Comply with built-up roofing manufacturer's written instructions, as submitted and reviewed by Architect during the submittal process, for installing roof insulation.
- B. (Wood Decks Only) Install one lapped rosin sheet course and mechanically fasten to substrate according to built-up roofing manufacturer's written instructions and as called for in these specifications and on the drawings.
- C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- D. Install tapered insulation under area of roofing to conform to slopes indicated.
- E. 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 with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

- F. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- G. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- H. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - a. Field: 16 screws per 4 foot by 8 foot panel (2 square feet per screw).
 - b. Perimeter: 24 screws per 4 foot by 8 foot panel (1.33 square feet per screw).
 - c. Corners: 32 screws per 4 foot by 8 foot panel (1 square foot per screw).
 - 2. Set each subsequent layer of insulation in Insuloc Insulation Adhesive by The Garland Company.
- I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and adhere to base layer insulation. Tape joints if required by roofing manufacturer.
 - 1. Apply insulation adhesive to underside and immediately bond cover board to substrate.

3.5. INSTALLATION COLD APPLIED ROOF SYSTEM

- 1. Base Ply: Cut base ply sheets into 18 foot lengths and allow plies to relax before installing. Install base sheet in Interply Adhesive: applied at the rate required by the manufacturer. Shingle base sheets uniformly to achieve one ply throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing.
- 2. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
- 3. Solidly bond to the substrate and adjacent ply with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
- 4. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Use care to eliminate air entrapment under the membrane.
- 5. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
- 6. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
- 7. Install base flashing ply to all perimeter and projection details.
- 8. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.
- B. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and allow plies to relax before installing. Install in interplay adhesive applied at the rate required by the manufacturer. Shingle sheets uniformly over the prepared substrate to achieve the number of plies

- specified. Shingle in proper direction to shed water on each large area of roofing.
1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
 2. Solidly bond to the base layers with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
 3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.
 4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
 5. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
 6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
 3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Install Tuff Stuff Urethane sealant at the top edge as required.
- G. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Solidly adhere the entire flashing ply to the substrate. Secure the tops of all flashings that are not run up and over curb through termination bar fastened at 6 inches (152 mm) O.C. and sealed at top.
 5. Seal all vertical laps of flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.

6. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- H. Flashing Cap Ply:
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
 6. All stripping shall be installed prior to flashing cap sheet installation.
 7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
 9. Three course all vertical laps and the top edge of the base flashing sheet with Flashing Bond Mastic & Garmesh Webbing. Install white roofing granules into the fresh mastic.
- I. Roof Walkways: Provide walkways in areas indicated on the drawings / plans or at a minimum;
- a. Install walk way pads in a path from all roof access points to and around all HVAC and serviceable mechanical equipment, to and around roof hatches, and as designated by the owner.

3.6. INSTALLATION OF SURFACING

- A. Prior to installation of surface coating, obtain approval from manufacturer as to work completed. On average, at least 30 days are required prior to final surfacing.
1. Reflective Coating:
 - a. Allow all cold applied mastics and coating to properly dry and cure before coating application.
 - b. Paint all exposed roofing with manufacturer's base coat acrylic coating installed at a rate of one (1.5) gallons per square, back roll entire installation required.
 - c. Paint all exposed roofing with manufacturer's Energy Star top coat acrylic coating installed at a rate of one (1.5) gallons per square, complete coverage for a clean neat appearance is required. Additional coats may be required to achieve complete coverage and proper mil thickness. Coating to be applied in a cross hatch pattern to the base coat.

3.7. INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Fabricated Flashings: Fabricated flashings and trim are provided as specified in Section 07620.

1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the Copper Development Association "Copper in Architecture - Handbook" as applicable.
- B. Metal Edge:
1. Inspect the nailers to assure proper attachment and configuration.
 2. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at 8 inches (203 mm) o.c.
 3. Install continuous cleat and fasten at 6 inches (152 mm) o.c.
 4. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailers every 3 inches (76 mm) o.c. staggered.
 5. Prime metal edge at a rate of 100 square feet per gallon and allow to dry.
 6. Strip in flange with base flashing ply covering entire flange in bitumen with 6 inches (152 mm) on to the field of roof. Assure ply laps do not coincide with metal laps.
 7. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Seal outside edge with rubberized cement.
- C. Roof Edge With Gutter:
1. Inspect the nailer to assure proper attachment and configuration. Increase slope at metal edge by additional degree of slope in first board.
 2. Run one ply over the edge. Assure coverage of all wood nailers. Fasten plies with ring shank nails at 8 inches (203 mm) o.c.
 3. Install gutter and strapping.
 4. Install continuous cleat and fasten at 6 inches (152 mm) o.c.
 5. Install new metal edge hooked to continuous cleat and set in bed of roof cement. Fasten flange to wood nailer every 3 inches (76 mm) o.c. staggered.
 6. Prime metal edge at a rate of 100 square feet per gallon and allow to dry.
 7. Strip in flange with base flashing ply covering entire flange in bitumen with 6 inches (152 mm) onto the field of the roof. Assure ply laps do not coincide with metal laps.
 8. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof.
- D. Scupper Through Wall (Overflow):
1. Inspect the nailer to assure proper attachment and configuration.
 2. Run one ply over nailer up the overflow, into the scupper hole and up flashing as in typical wall flashing detail. Assure coverage of all wood nailers.
 3. Install scupper box in a 1/4 inch (6 mm) bed of mastic. Assure all box seams are soldered and have a minimum 4 inch (101 mm) flange. Make sure all corners are closed and soldered. Prime scupper at a rate of 100 square feet per gallon and allow to dry.
 4. Fasten flange of scupper box every 3 inches (76 mm) o.c. staggered.
 5. Strip in flange scupper box with base flashing ply covering entire area with 6 inch (152 mm) overlap on to the field of the roof and wall flashing.
 6. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams.
- E. Coping Cap:
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Attach tapered board to top of wall.
 4. Install base flashing ply covering entire wall and wrapped over top of wall and down face with 6 inches (152 mm) on to field of roof and set in cold asphalt. Nail membrane at 8 inches (203 mm) o.c.

5. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all seams and install white roofing granules in fresh mastic.
 6. Install continuous cleat and fasten at 6 inches (152 mm) o.c. to outside wall.
 7. Install new metal coping cap hooked to continuous cleat.
 8. Fasten inside cap 24 inches (609 mm) o.c. with approved fasteners and neoprene washers through slotted holes, which allow for expansion and contraction.
- F. Surface Mounted Counterflashing:
1. Minimum flashing height is 8 inches (203 mm) above finished roof height. Maximum flashing height is 24 inches (609 mm). Prime vertical wall at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering wall set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and install white roofing granules in fresh mastic.
 5. Apply butyl tape to wall behind flashing. Secure termination bar through flashing, butyl tape and into wall. Alternatively use caulk to replace the butyl tape.
 6. Secure counterflashing set on butyl tape above flashing at 8 inches (203 mm) o.c. and caulk top of counterflashing.
- G. Equipment Support:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and install white roofing granules in fresh roofing mastic.
 5. Install pre-manufactured cover. Fasten sides at 24 inches (609 mm) o.c. with fasteners and neoprene washers. Furnish all joint cover laps with butyl tape between metal covers.
 6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- H. Curb Detail/Air Handling Station:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Apply a three-course application of mastic and mesh at all vertical seams and install white roofing granules into fresh mastic.
 5. Install pre-manufactured counterflashing with fasteners and neoprene washers or per manufacturer's recommendations.
 6. Set equipment on neoprene pad and fasten as required by equipment manufacturer.
- I. Skylight:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all field plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb set in bitumen with 6 inches (152 mm) on to

- field of the roof.
4. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof. Attach top of membrane to top of wood nailer and apply a three-course application of mastic and mesh. Allow to cure and install white roofing granules in fresh mastic.
 5. Install pre-manufactured lens and fasten flashing sides at 8 inches (203 mm) o.c. with fasteners and neoprene washers.
- J. Exhaust Fan:
1. Minimum curb height is 8 inches (203 mm) above finished roof height. Prime vertical at a rate of 100 square feet per gallon and allow to dry.
 2. Set cant in bitumen. Run all plies over cant a minimum of 2 inches (50 mm).
 3. Install base flashing ply covering curb with 6 inches (152 mm) on to field of the roof.
 4. Install a second ply of modified flashing ply installed over the base flashing ply, 9 inches (228 mm) on to field of the roof. Attach top of membrane to top of wood curb and nail at 8 inches (203 mm) o.c. Apply a three-course application of mastic and mesh at all vertical seams and install white roofing granules into fresh mastic.
 5. Install metal exhaust fan over the wood nailers and flashing to act as counterflashing. Fasten per manufacturer's recommendation.
- K. Roof Drain:
1. Plug drain to prevent debris from entering plumbing.
 2. Taper insulation to drain minimum of 24 inches (609 mm) from center of drain.
 3. Install two base flashing plies (40 inch square minimum) in bitumen.
 4. Set lead/copper flashing (30 inch square minimum) in 1/4 inch (6 mm) bed of mastic. Run lead/copper into drain a minimum of 2 inches (50 mm). Prime lead/copper at a rate of 100 square feet per gallon and allow to dry.
 5. Run roof system plies over drain. Cut out plies inside drain bowl.
 6. Install modified membrane (48 inch square minimum) in bitumen.
 7. Install clamping ring and assure that all plies are under the clamping ring.
 8. Remove drain plug and install strainer.
- L. Plumbing Stack:
1. Minimum stack height is 12 inches (609 mm).
 2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
 3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
 4. Install base flashing ply in bitumen.
 5. Install membrane in bitumen.
 6. Caulk the intersection of the membrane with elastomeric sealant.
 7. Install a factory lead counter flashing cap over the top of the pipe. Caulking and banding or rolling the lead inside the pipe will not be accepted.
- M. Heat Stack:
1. Minimum stack height is 12 inches (609 mm).
 2. Run roof system over the entire surface of the roof. Seal the base of the stack with elastomeric sealant.
 3. Prime flange of new sleeve. Install properly sized sleeves set in 1/4 inch (6 mm) bed of roof cement.
 4. Install base flashing ply in bitumen.
 5. Install modified membrane in bitumen.
 6. Caulk the intersection of the membrane with elastomeric sealant.
 7. Install new collar over cape. Weld collar or install stainless steel draw brand.

3.8. CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.9. PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.10. FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at start-up and two (2) days per week through project completion. Provide a final inspection upon completion of the Work.
 - 1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 - 2. Field observations shall be performed by a representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 - 3. Provide observation reports from the representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 - 4. Provide a final report from the representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.11. SCHEDULES

- A. Base (Ply) Sheet:
 - 1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1. 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
 - 2. 50mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
 - 2. 50mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1. 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
 - 2. 50mm/min @ -17.78 +/- 2 deg. C MD 4 % XD 4 %
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)
- B. Modified (Cap) Sheet:
 - 1. StressPly Plus FR Mineral: 155 mil SBS (Styrene-Butadiene-Styrene) mineral

surfaced, rubber modified roofing membrane reinforced with a fiberglass and polyester composite scrim. ASTM D 6162, Type III Grade G

- a. Tensile Strength, ASTM D 5147
 1. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
 2. 50 mm/min. @ 23 +/- 2 deg. C MD 54.25 kN/m XD 54.25 kN/m
 - b. Tear Strength, ASTM D 5147
 1. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
 2. 50 mm/min. @ 23 +/- 2 deg. C MD 2224 N XD 2224 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 1. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
 2. 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
- C. Interply Adhesive:
1. Weatherking Plus WC: Rubberized, polymer modified cold process asphalt roofing bitumen V.O.C. compliant ASTM D 3019. Performance Requirements:
 - a. Non-Volatile Content ASTM D 4479 78%
 - b. Density ASTM D1475 9.0 lbs./gal.
 - c. Viscosity Stormer ASTM D562 900-1100 grams
 - d. Flash Point ASTM D 93 100 deg. F min. (37 deg. C)
 - e. Slope: up to 2:12
 - f. V.O.C. ASTM D 3960 Less than 250 g/l
 - g. Flash Point ASTM D 93 105 deg. F
 - h. Slope maximum 1:12
- D. Flashing Base Ply:
1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 1. 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
 2. 50 mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
 - b. Tear Strength, ASTM D 5147
 1. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
 2. 50 mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 1. 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
 2. 50 mm/min. @ -17.78 +/- 2 deg. C MD 4 % XD 4 %
 - d. Low Temperature Flexibility, ASTM D 5147
 1. Passes -40 deg. F (-40 deg. C)
- E. Flashing Ply Adhesive:
1. Flashing Bond: Asphalt roofing mastic V.O.C. compliant, ASTM D 2822, Type II trowel grade flashing adhesive.
 - a. Non-Volatile Content ASTM D 4479 70 min.
 - b. Density ASTM D 1475 8.3 lbs./gal. (1kg/l)
 - c. Flash Point ASTM D 93 103 deg. F (39 deg. C)
- F. Surfacing:
1. Flashing (Cap) Sheet:
 - a. StressPly Plus FR Mineral: 155 mil SBS (Styrene-Butadiene-Styrene) mineral surfaced, rubber modified roofing membrane reinforced with a fiberglass and polyester composite scrim. ASTM D 6162, Type III Grade G
 1. Tensile Strength, ASTM D 5147
 - a. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 310 lbf/in XD 310 lbf/in
 - b. 50 mm/min. @ 23 +/- 2 deg. C MD 54.25 kN/m XD 54.25 kN/m

2. Tear Strength, ASTM D 5147
 - a. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf XD 500 lbf
 - b. 50 mm/min. @ 23 +/- 2 deg. C MD 2224 N XD 2224 N
 3. Elongation at Maximum Tensile, ASTM D 5147
 - a. 2 in/min. @ 73.4 +/- 3.6 deg. F MD 8% XD 8%
 - b. 50 mm/min. @ 23 +/- 2 deg. C MD 8% XD 8%
 4. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
- G. Coating:
1. White Elastomeric Roof Coating:
 - a. Pyramic Plus Lo Acrylic Roof Coating: White, Water-Based, Acrylic-Urethane, Non Toxic, Fire Retardant Roof Coating.
 1. Non Volatile 63%
 2. Density 11.7lb. / gal
 3. VOC >50 gal./l
 4. Reflectance 0.83
 5. Emittance 0.90
 6. SRI 104

3.12. OWNER SUPPLIED MATERIALS

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
 - B. Any material or accessories required for the installation of the roof system in excess of the Owner provided material must be supplied by the Contractor and added into the bid cost proposal. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.
 - C. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
 - D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 075500.
 - E. Freight charges of owner supplied materials will be the responsibility of the Owner.
 - F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at jobsite.
 - G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 07550.
1. Materials specifically provided by the Owner:
 - a. See Specification Section 016400 OFCI

END OF SECTION

SECTION 09800

ELASTOMERIC ACRYLIC WALL COATING

PART 1 – GENERAL

1. SUMMARY

- A. Installation of a one component, low solvent, emulsified poly-resin architectural wall coating. It damp proofs and beautifies all types of exterior and interior masonry surfaces such as concrete, brick work, stucco and exterior insulating finishing systems (EIFS).

2. RELATED SECTIONS

- A. Drains, Vents, Ducts, Penetrations: Section 07700
- B. Cast-In-Place Concrete: Section 03300
- C. Repairs and cleaning of masonry surfaces: Section 04500
- D. Repairs to expansion joints and application of joint sealants: Section: 07900

3. SUBMITTALS

- A. Product Data: Submit manufacturer's standard submittal package including specification, installation instructions, and general information for each waterproofing material.
- B. Applicator Qualifications: Submit a current qualified applicator certificate from the specified waterproofing manufacturer.

4. QUALIFICATIONS

- A. Primary elastomeric coating materials shall be products from a single manufacturer. The primary manufacturer shall recommend any secondary materials. Manufacturer shall have a minimum of 10 years experience in the manufacturing of materials of this type.
- B. Applicators shall have a minimum of 5 years experience in the application of damp proofing materials of the type specified. Applicator shall be an authorized applicator from the specified damp proofing manufacturer.
- D. Pre-Installation Conference: Just prior to commencement of the elastomeric coating system, meet at the site with a representative of the coating manufacturer. The elastomeric coating contractor, the general contractor, the architect and other parties affected by this section. Review methods and procedures, substrate conditions, scheduling and safety.

5. DELIVERY, STORAGE AND HANDLING

- A. Store all coating materials in the original unopened containers between 50° - 80°F (10° - 26°C) until ready for use.

- B. Follow the special handling or storage requirements of the manufacturer for cold weather, hot weather, etc.
- C. Safety: Refer to all applicable data, including but not limited to, MSDS sheets, PDS sheets, product labels, and specific instructions for specific personal protection requirements.
- D. Ventilation: Provide adequate ventilation to prevent the accumulation of hazardous fumes during application.
- E. Environmental requirements: Proceed with work of this section only when existing and forecasted weather conditions will permit the application to be performed in accordance with the manufacturer's recommendations.

6. WARRANTY

- A. The contractor shall guarantee that all work performed will be free from defects in materials and workmanship. The contractor is to provide a 3 year labor/workmanship warranty. Upon notice of defect in writing, the contractor shall, at his own expense, make all necessary repairs or replacements of the defective work in question.
- B. A 5-year, material warranty is available with this system provided it has been installed by a Garland Approved Applicator and is installed according to this specification.

PART 2 – PRODUCTS

1. MANUFACTURERS

- A. The design is based upon coating systems engineered and manufactured by The Garland Company or approved equals:

The Garland Company
3800 East 91st Street
Cleveland, Ohio 44105
Telephone: (559) 647-1196
Local Representative: Rich Jones
Website: www.garlandco.com

2. MATERIALS

- A. Emulsified Acrylic Coating: Tuff-Coat for damp proofing and beautifying all types of exterior and interior masonry surfaces such as concrete, brick work, stucco and exterior insulation finish systems (EFIS).

Tuff-Coat has the following physical properties:

Tensile Strength: 160 psi (ASTM D-2370)

Elongation: 585% (ASTM D-2370)

Water Vapor Permeability @ 10 mils: 20 Perms (ASTM D-1653)

Solids by Volume: 47.4%

Textured Emulsified Acrylic Coating: Tuff-Coat Textured for damp proofing and beautifying all types of exterior and interior masonry surfaces such as concrete, brick work, stucco and exterior insulation finishing system (EFIS).

Tuff-Coat Textured has the following physical properties:

Tensile Strength: 130 psi (ASTM D-2370)

Elongation: 331% (ASTM D-2370)

Water Vapor Permeability @ 10 mils: 20 Perms (ASTM D-1653)

Solids by Volume: 47.4%

- B. Hybrid Sealant: Tuff-Stuff MS single-component MS Polymer sealant for joints and cracks in masonry surfaces.
- C. Cement-based patching compound: Gar-Rock is an all-weather, fast setting, chemical action concrete patching material designed to patch concrete surfaces where quick permanent repairs are desired. (Coating will not adhere to Gar-Rock Compound).
- D. Epoxy-based patching compound: Fill-Loc Crack Repair is a two-component, VOC compliant, 100% solids epoxy patching product designed to make repairs to small surface imperfections prior to applying a thin coating.
- E. Polyester Tape: Dura-Walk Polyester Tape is a fusion bonded fabric polyester designed to be reinforcement fabric over cracks or joints.
- F. Nontoxic Biodegradable Cleaner: B-Clean is a heavy-duty chemical formulation designed to clean a variety of masonry substrates including: concrete, brick, stone, aggregate, and block surfaces.
- G. Misc. Accessories: All items incorporated into this system shall be compatible with and approved by coating manufacturer.

NOTE: Allow additional material for rough or irregular surfaces and up to 10% for material loss during application and differences in substrate porosity.

PART 3 – EXECUTION

1. EXAMINATION

- A. Verify that substrate is ready to receive work; surface is clean, dry and free from projections and depressions, loose scale, sand, curing compounds, grease, oil, asphalt, loose coatings need removed and other foreign deposits.
- B. Do not begin work until concrete substrate has cured 28 days, minimum. Water cured treatment of concrete is preferred. Resin or water based curing compound should not be used. Non-compatible curing agents must be removed prior to application.
- C. The work shall not be started when temperature is under 50°F (10°C) or when precipitation is imminent.
- D. Verify that all other work involved with this area, done under other sections, has been completed and accepted by the architect and general contractor prior to starting the waterproofing application.
- E. Concrete surface pH level must not be higher than 11 prior to coating.
- F. Damaged areas of concrete, mortar joints or EFIS should be repaired prior to coating.

2. PREPARATION

- A. Clean substrate to remove any and all surface contaminants. Surfaces to be coated must be cleaned to a sound surface. Refer to your Garland representative for specific preparation techniques.
- B. Mask-off all adjoining areas that are not to receive the elastomeric wall coating.
- C. Provide a suitable workstation to mix the coating materials.
- D. Concrete: Special attention should be given to smoothness of surface and freedom from contaminants, including paint or previous coatings. Consult your Garland representative for alternate procedures for coating over existing paint. Such procedures are highly dependent on specific job conditions. Curing compounds, if used, shall be removed either by blast media or etching. In the event specifications are not met, the following corrective procedures are recommended.
- E. Cleaning Methods:
 - 1. Nontoxic Biodegradable Cleaner: Nontoxic Biodegradable Concrete & Masonry Cleaner: Scrape, sand, or wire brush all hard or glossy surfaces and residual contaminants to assure effective cleaning. Use the most abrasive methods necessary to remove all contaminants that will inhibit the cleaning solution from properly saturating the substrate.
Rinse the substrate to be treated thoroughly with clean water to remove excess debris and dampen the surface. Beginning at the top of the substrate working down to the bottom, generously apply the B-Clean solution directly to the affected areas using overlapping patterns. Allow the solution to soak into surface for 20-30 minutes. Do NOT allow surface to dry. Reapply a light mist of the solution intermittently to ensure the surface remains damp. Depending on the degree of contamination and exposure a stiff bristle brush may be required once the solution reacts. Next, using overlapping patterns rinse the surface from top to bottom with water. Additional applications may be required dependent upon the severity of the contaminant, using the same approach as above. Allow the substrate sufficient time to dry.
 - 2. Solvent & Acid Cleaners: Wipe up grease or oil with a solvent and absorbent material. Disposal of this material should be in accordance with local laws and codes. Wash with solvent-alkaline cleaners diluted one part cleaner and five parts water. Rinse thoroughly with clean water. If evidence of oil film remains as indicated by water "beading," etch surface with 10% solution muriatic acid. Agitate surface with stiff bristle broom; then rinse with clean water.
Remove curing compounds by etching with 10% muriatic acid followed by clean water rinse. Allow to thoroughly dry before applying coating. Grinding or sandblasting can remove heavy deposits of contaminants. Any residual traces of asphalt stains must be sealed with an epoxy primer to avoid staining of light colored top coats. Apply primer in two coats and allow a minimum of 48 hours cure time.
- F. Cracks less than 1/16" (1.5 mm) wide shall be sealed after cleaning has been performed using an elastomeric hybrid sealant. Crack shall be cleared of all loose debris, dirt and widened slightly at the surface to accommodate elastomeric hybrid sealant. Apply elastomeric hybrid sealant by knifing into crack or gunning over crack surface, followed by tooling to match adjacent surface profile, pressing the sealant into the crack cavity to fill completely.

- G. Cracks 1/16" (1.5 mm) to 1/8" (3.0 mm) wide shall be routed to a 1/4" to 1/2" groove, backer rod shall be installed, groove shall be caulked with elastomeric hybrid sealant. Fill grooves flush with adjacent surfaces.
- H. Allow sufficient curing time for all sealants to dry-through before proceeding with elastomeric coating application – at least 1 hour not exceeding 3 hours prior to stripe coating with approved elastomeric coating.
- I. All sealed expansion joints or sealant repairs must be stripe coated within 1-3 hours with a half inch nap roller or approved brush extending the coating a minimum of 2 inches past the perimeter of the joints sealant or sealant repair ensuring a good protective base of the elastomeric coating is present.
- I. Defective mortar or stucco areas should be repaired using a cement-based patching compound.

3. INSTALLATION

- A. Technical Advice: The installation of this elastomeric coating system shall be accomplished in the presence of, or with the advice of the manufacturer's technical representative.
- B. Joint Treatment:
 - 1. Non-moving Cracks: Stripe coats all non-moving cracks. Fill the crack first with a bead of Tuff-Stuff MS sealant and strike flush. After filling, apply Tuff-Coat for a distance of 2" on each side of the crack 16-20 mils thick and allow curing. When applying the elastomeric coating system on the wall, go over the stripe coat to achieve a total thickness of 48-52 mils.
 - 2. Moving Cracks: Remove all dirt and loose chips of concrete from the crack. Fill with Tuff-Stuff MS and strike flush with the wall surface. Center 4" wide piece of polyester tape over the crack and adhere it firmly and thoroughly to the wall. Stripe coat 16-20 mils of Tuff-Coat over the polyester tape and for 2" on each side of the crack. When applying the elastomeric coating system on the wall, go over the stripe coat to achieve a total thickness of 48-52 mils.
 - 3. Control Joints: Place a backer material (solvent expanded plastic such as polyethylene or polypropylene) in joint. The backer material should be oversized so it can be compressed into the joint and flush to the wall surface. Apply a bead of Tuff-Stuff MS sealant over the backer rod sealing the joint and strike flush with the wall surface.
- C. Elastomeric Coating: Apply Tuff-Coat to secure a total minimum coverage of 2 gallons per 100 square feet (total wet film thickness 32 mils). Product shall be applied by phenolic core roller or airless spray at a rate of 100-200 sq. ft. per gallon depending on the porosity and roughness of the surface with a minimum 2 coat process.
- D. Elastomeric Coating: Apply Tuff-Coat Textured to secure a total minimum coverage of 2 gallons per 100 sq. ft. (Total wet film thickness 32 mils). Product shall be applied by phenolic core roller at a rate of 60-80 sq. ft. per gallon depending on the porosity and roughness of the surface with a minimum 2 coat process. (Cannot spray this version).
- E. Thickened High Build Elastomeric Coating: Apply Tuff-Coat HB to secure a total minimum coverage of 2 gallons per 100 sq. ft. (Total wet film thickness 32 mils). Embed a soft polyester fabric prior to second coat. Product shall be applied by phenolic core roller at a rate of 100-200 sq. ft. per gallon depending on the porosity and roughness of the surface with a minimum 2 coat process. The second coat will completely cover the polyester fabric. (Cannot spray this version).

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3.4. FIELD QUALITY CONTROL

- A. The contractor for work under this section shall maintain a quality control program specifically to verify compliance with this specification. A daily log shall be kept to record actions in the field.
- B. Inspections: A minimum of three (Substrate, Application and Final) inspections by an approved manufacturer's representative, will be required on all projects requiring a warranty.

END OF SECTION

SECTION 07 62 01

ROOFING RELATED COPING, SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

2. SUMMARY

- A. Provide all labor, equipment, and materials to fabricate and install the following.
 - 1. Drip Edge, Gravel Stop, and Flashing
 - 2. Fascia, Scuppers, and Trim
 - 3. Coping Cap at Parapets Pre Manufactured Systems
 - 4. Expansion Joint and Area Divider Covers
 - 5. Fascia and Edge Pre Manufactured Systems
 - 6. Gutters, Scuppers and Down Spouts
- B. Related Sections:
 - 1. Division 07 Section Common Work Results for Thermal and Moisture Protection
- C. Related Work Specified Elsewhere:
 - 1. Division 06 Section - Rough Carpentry
 - 2. Division 07 Section - Modified Bituminous Membrane Roofing
 - 3. Division 07 Section - Metal Roofing
 - 4. Division 07 Section - Metal Wall / Soffit Panels
 - 5. Division 07 Section - Joint Sealants
 - 6. Division 07 Section - Manufactured Metal Roof Panels
 - 7. Division 07 Section - Manufactured Metal Wall Panels

1.3. REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (galvanized) or Zinc-Iron Alloy-Coated (galvannealed) by the Hot-Dip Process.
 - 2. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
 - 3. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 4. ASTM B221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 5. ASTM D692 Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.
- B. American National Standards Institute and Single Ply Roofing Institute (ANSI/SPRI)
 - 1. ANSI/SPRI ES-1 Testing and Certification Listing of Shop Fabricated Edge Metal
- C. Warnock Hersey International, Inc., Middleton, WI (WH)

- D. Factory Mutual Research Corporation (FMRC)
 - 1. FM 1-49 Loss Prevention Data Sheet
- E. Underwriters Laboratories (UL)
- F. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - 1. 1993 Edition Architectural Sheet Metal Manual
- G. National Roofing Contractors Association (NRCA)
 - 1. Roofing and Waterproofing Manual
- H. American Society of Civil Engineers (ASCE)
 - 1. ASCE 7 Minimum Design Loads for Buildings and Other Structures

1.4. SUBMITTALS FOR REVIEW

- A. Product Data:
 - 1. Provide manufacturer's specification data sheets for each product.
 - 2. Metal material characteristics and installation recommendations.
 - 3. Submit color chart prior to material ordering and/or fabrication so that equivalent colors to those specified can be approved.
- B. Samples: Submit two (2) samples, illustrating typical metal edge, coping, gutters, fascia extenders for material and finish.
- C. Shop Drawings
 - 1. For manufactured and ANSI/SPRI ES-1 compliant shop fabricated gravel stops, fascia, scuppers, and all other sheet metal fabrications.
 - 2. Indicate material profile, jointing details, fastening methods, flashing, terminations, and installation details.
 - 3. Indicate type, gauge and finish of metal
- D. Specimen Warranty: Provide an unexecuted copy of the warranty specified for this Project, identifying the terms and conditions required of the Manufacturer and the Owner.

1.5. SUBMITTALS FOR INFORMATION

- A. Design Loads: Any material submitted as equal to the specified material must be accompanied by a report signed and sealed by a professional engineer licensed in the state in which the installation is to take place. This report shall show that the submitted equal meets the wind uplift and perimeter attachment requirements according to ASCE 7 and that the submitted equal edge metal system is compliant with the ANSI/SPRI ES-1 standard. Substitution requests submitted without licensed engineer approval will be rejected for non-conformance.
- B. Factory Mutual Research Corporation's (FMRC) wind uplift resistance classification: The roof perimeter flashing shall conform to the requirements as defined by the FMRC Loss Prevention Data Sheet 1-49.
- C. A letter from the manufacturing company certifying that the materials furnished for this project are the same as represented in tests and supporting data.
- D. Mill production reports certifying that the steel thicknesses are within allowable tolerances of the nominal or minimum thickness or gauge specified.
- E. Certification of work progress inspection. Refer to Quality Assurance Article below.

- F. Certifications.
 - 1. Submit roof manufacturer's certification that metal fasteners furnished are acceptable to roof manufacturer.
 - 2. Submit roof manufacturer's certification that metal furnished is acceptable to roofing manufacturer as a component of roofing system and is eligible for roof manufacturer's system warranty.

1.6. CONTRACT CLOSEOUT SUBMITTALS

- A. General: Comply with Requirements of Section 01 78 00 – Closeout Submittals
- B. Special Project Warranty: Provide specified warranty for the Project, executed by the authorized agent of the Manufacturer.
- C. Roofing Maintenance Instructions. Provide a manual of manufacturer's recommendations for maintenance of installed roofing systems.
- D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.7. QUALITY ASSURANCE

- A. Engage an experienced roofing contractor specializing in sheet metal flashing work with a minimum of five (5) years experience.
- B. Maintain a full-time supervisor/foreman who is on the job-site at all times during installation. Foreman must have a minimum of five (5) years experience with the installation of similar system to that specified.
- C. Source Limitation: Obtain components from a single manufacturer. Secondary products which cannot be supplied by the specified manufacturer shall be approved in writing by the primary manufacturer prior to bidding.
- D. Upon request fabricator/installer shall submit work experience and evidence of financial responsibility. The Owner's representative reserves the right to inspect fabrication facilities in determining qualifications.

1.8. DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened containers or packages with labels intact and legible.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

1.9. PROJECT CONDITIONS

- A. Determine that work of other trades will not hamper or conflict with necessary fabrication and storage requirements for pre-formed metal edge system.

1.10. DESIGN AND PERFORMANCE CRITERIA

- A. Thermal expansion and contraction:
 - 1. Completed metal edge flashing system, shall be capable of withstanding expansion and contraction of components caused by changes in temperature

without buckling, producing excess stress on structure, anchors or fasteners, or reducing performance ability.

1.1. WARRANTIES

- A. Owner shall receive one (1) warranty from manufacturer of roofing materials covering all of the following criteria. Multiple warranties are not acceptable.
 - 1. Pre-finished metal material shall require a written thirty (30)- year non-prorated warranty covering fade, chalking and film integrity. The material shall not show a color change greater than 5 NBS color units per ASTM D2244 or chalking excess of 8 units per ASTM D659. If either occurs material shall be replaced per warranty, at no cost to the Owner.
 - 2. Changes: Changes or alterations in the edge metal system without prior written consent from the manufacturer shall render the system unacceptable for a warranty.
 - 3. Warranty shall commence on date of substantial completion or final payment, whichever is agreed by contract.
 - 4. The Contractor shall provide the Owner with a notarized written warranty assuring that all sheet metal work including caulking and fasteners to be watertight and secure for a period of two years from the date of final acceptance of the building. Warranty shall include all materials and workmanship required to repair any leaks that develop, and make good any damage to other work or equipment caused by such leaks or the repairs thereof.
 - 5. Installing roofing contractor shall be responsible for the installation of the edge metal system in general accordance with the membrane manufacturer's recommendations.
 - 6. Installing contractor shall certify that the edge metal system has been installed per the manufacturer's printed details and specifications.
 - 7. One manufacturer shall provide a single warranty for all accessory metal for flashings, metal edges and copings, along with the warranty for metal roof areas, membrane roof areas, and any transitions between two different material types.

PART 2 – PRODUCTS

1. PRODUCTS, GENERAL

- A. Refer to Division 01 Section "Common Product Requirements."
- B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.
- C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.
 - 1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section.
 - 2. Include a list of three (3) projects of similar type and extent, located within a one hundred mile radius from the location of the project. In addition, the

- three projects must be at least five (5) years old and be available for inspection by the Architect, Owner or Owner's Representative.
3. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.
4. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2. ACCEPTABLE MANUFACTURERS

- A. The design is based upon roofing systems engineered and manufactured by

The Garland Company
 3800 East 91st Street
 Cleveland, Ohio 44105
 Representative: Rich Jones
 Telephone: (559) 647-1196
 Website: www.garlandco.com

3. MATERIALS

- A. General: Product designations for the materials used in this section shall be based on performance characteristics of the R-Mer Coping metal edge system manufactured by The Garland Company, Cleveland, OH, and shall form the basis of the contract documents.
- B. Materials: Minimum gauge of steel or thickness of Aluminum to be specified in accordance with Architectural Sheet Metal Manual, Sheet Metal and Air Conditioning Contractor's National Association, Inc. recommendations.
- C. R-Mer Edge Coping Cap Cover and Splice Plate
 1. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 22 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 2. Aluminum, ASTM B209, alloy 3105-H14, in thickness of .040" nom. or .050" nom. Will be based on the total wall width to meet ANSI SPRI ES1 Testing.
 3. R-Mer Edge Coping Chairs
 4. Zinc-coated steel, ASTM A653, coating designation G-90, in thickness of 0.0635 nom./ 16 gauge, 36" to 48" by coil length, chemically treated, commercial or lock-forming quality.
 5. Finishes
 6. Exposed surfaces for coated panels:
 - a. Steel Finishes: fluorocarbon finish. Epoxy primer baked both sides, .2-.25 mils thickness as approved by finish coat manufacturer. Weathering finish as referred by National Coil Coaters Association (NCCA).

PROPERTY	TEST METHOD	FLUOROCARBON*
Pencil	ASTM D3363	HB-H
Hardness	NCCA II-2	

Bend	ASTM D-4145 NCCA II-19	O-T
Cross-Hatch Adhesion	ASTM D3359	no loss of adhesion
Gloss (60° angle)	ASTM D523	25+/-5%
Reverse Impact	ASTM D2794	no cracking or loss of adhesion
Nominal Thickness	ASTM D1005	
Primer Topcoat		0.2 mils 0.7 mils min
Clear Coat (optional, only to be used with 22 gauge steel)		0.3 mils

*Subject to minimum quantity requirements

b. Color shall be GARLAND Heritage Red

2. Exposed and unexposed surfaces for mill finish flashing, fascia, and coping cap, shall be as shipped from the mil

4. RELATED MATERIALS AND ACCESSORIES

- A. Metal Primer: Zinc chromate type.
- B. Plastic Cement: ASTM D 4586
- C. Sealant: Specified in Section 07900 or on drawings.
- D. Self-Adhering Underlayment:
 1. 45 mil high temperature underlayment with cross laminated polymer surface.
R-Mer Seal by The Garland Company
- E. Slip Sheet: Rosin sized building paper.
- F. Fasteners:
 1. Corrosion resistant screw fastener as recommended by metal manufacturer.
Finish exposed fasteners same as flashing metal.
 2. Fastening shall conform to Factory Mutual requirements or as stated on
section details, whichever is more stringent.
- H. Gutter and Downspout Anchorage Devices: Material as specified for system

PART 3 – EXECUTION

3. EXECUTION, GENERAL

- A. Refer to Division 07 Section Common Work Results for Thermal and Moisture Protection.

4. PROTECTION

- A. Isolate metal products from dissimilar metals, masonry or concrete with bituminous paint, tape, or slip sheet. Use gasketed fasteners where required to prevent corrosive reactions.

5. GENERAL

- A. Secure fascia to wood nailers at the bottom edge with a continuous cleat.
- B. Fastening of metal to walls and wood blocking shall comply with building code standards.
- C. All accessories or other items essential to the completeness of sheet metal installation, whether specifically indicated or not, shall be provided and of the same material as item to which applied.
- D. Allow sufficient clearances for expansion and contraction of linear metal components. Secure metal using fasteners as required by the system. Exposed face fastening will be rejected.

6. INSPECTION

- A. Verify that curbs are solidly set and nailing strips located.
- B. Perform field measurements prior to fabrication.
- C. Coordinate work with work of other trades.
- D. Verify that substrate is dry, clean and free of foreign matter.
- E. Commencement of installation shall be considered acceptance of existing conditions.

7. MANUFACTURED SHEET METAL SYSTEMS

- A. Furnish and install manufactured fascia and coping cap systems in strict accordance with manufacturer's printed instructions.
- B. Provide factory-fabricated accessories including, but not limited to, fascia extenders, miters, scuppers, joint covers, etc. refer to Source limitation provision in Part 1.

8. SHOP-FABRICATED SHEET METAL

- A. Metal work shall be shop fabricated to configurations and forms in accordance with recognized sheet metal practices.
- B. Hem exposed edges.
- C. Angle bottom edges of exposed vertical surfaces to form drip.
- D. Lap corners with adjoining pieces fastened and set in sealant.
- E. Form joints for gravel stop fascia system, coping cap with a 3/8" opening between sections. Back the opening with an internal drainage plate formed to the profile of fascia piece.

- F. Install sheet metal to comply with referenced ANSI/SPRI, SMACNA and NRCA standards.

9. FLASHING MEMBRANE INSTALLATION

- A. Scupper Through Roof Edge
1. Install scupper box in a one fourth (1/4) inch bed of mastic. Assure all box seams are soldered and have minimum four (4) inch flange. Make sure all corners are closed and soldered.
 2. Prime metal edge at a rate of one hundred (100) square feet per gallon and allow to dry.
- B. Drip Edge Detail
1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Install continuous cleat on face of nailer and fasten six (6) inches on center.
 3. Install new Drip Edge hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
 4. Drip Edge flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches onto roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
- F. Gravel Stop Detail
1. Position base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Install continuous cleat on face of nailer and fasten six (6) inches on center.
 3. Install new Gravel Stop hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
 4. Strip in Gravel Stop flange with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
- G. Edge Metal With Gutter
1. Positions base plies of the Built-Up and/or Modified Roofing membrane over the roof edge covering nailers completely, fastening eight (8) inches on center. Install manufacturer's membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Install gutter and strapping fastening six (6) inches on center.
 3. Install continuous cleat on face of nailer and fasten six (6) inches on center.
 4. Install new edge metal hooked to continuous cleat. Set metal flange into roofing cement, nail every three (3) inches on center, and prime at a rate of one hundred (100) square feet per gallon.
 5. Strip in edge metal with base flashing membrane extending six (6) inches into roof field, followed with a cap sheet extending nine (9) inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
- H. Snap-On Coping Cap Detail
1. Install Miters first.

2. Position base flashing of the Built-Up and/or Modified Roofing membrane over the wall edge covering nailers completely, fastening eight (8) inches on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
3. Install minimum sixteen (16) gauge, sixteen (16) inch long by specified width anchor chair at [Contact Garland Representative] feet on center.
4. Install six (6) inch wide splice plate by centering over sixteen (16) inch long by specified width anchor chair. Apply two beads of sealant to either side of the splice plate's center. Approximately two (2) inches from the coping cap joint. Install Coping Cap by hooking outside hem of coping on outside face of anchor chair. Press downward on inside edge of coping until "snap" occurs and hem is engaged on the entire chair.

10. CLEANING

- A. Clean installed work in accordance with the manufacturer's instructions.
- B. Replace damaged work than cannot be restored by normal cleaning methods.

11. CONSTRUCTION WASTE MANAGEMENT

- A. Remove and properly dispose of waste products generated. Comply with requirements of authorities having jurisdiction.

12. FINAL INSPECTION

- A. At completion of installation and associated work, meet with Contractor, Architect, installer, installer of associated work, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of roofing system.
- B. Inspect work and flashing of roof penetrations, walls, curbs, and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.
- C. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- D. Notify the [Contractor] [Architect] [Owner] upon completion of corrections.
- E. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.
- F. Immediately correct roof leakage during construction. If the Contractor does not respond within twenty-four (24) hours, the Owner will exercise rights to correct the Work under the terms of the Conditions of the Contract.

13. DEMONSTRATION AND TRAINING

- A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:
 1. Troubleshooting procedures
 2. Notification procedures for reporting leaks or other apparent roofing problems
 3. Maintenance
 4. The Owner's obligations for maintaining the warranty in effect and force
 5. The Manufacturer's obligations for maintaining the warranty in effect and force.

3. OWNER SUPPLIED MATERIALS

- A. The Owner will only supply the quantity listed in the owner supplied materials section of this specification below. All additional materials and accessories will be the full responsibility of the contractor to provide and install per the specification and project requirements.
- B. Any material or accessories required for the installation of the roof system in excess of the Owner provided material must be supplied by the Contractor and added into the bid cost proposal. It is up to the Contractor to determine the precise amount of material required for the completion of this project; and to provide excess material, as required. The cost to handle and fabricate flashing metal from the Owner provided flat stock is contractor's responsibility and to be added into the bid cost proposal.
- C. All required flashings as required per each specification section for plumbing, electrical, gas, etc. will be the Contractors responsibility to provide and install as well as to be included in the bid cost.
- D. All materials not specifically included in the owner supplied materials section will be the responsibility of the contractor to provide and install in compliance with section 076201.
- E. Freight charges of owner supplied materials will be the responsibility of the Owner.
- F. Contractor must coordinate and take delivery of materials, count all materials and ensure it matches the list below, unload and properly locate materials at the job site, and properly protect, cover and store at jobsite.
- G. Contractor must be able to provide certification in writing from roof system manufacturer that the contractor is approved to install the specified roof system and provide all warranty requirements of section 076201.
- H. Materials specifically provided by the owner:
 - A. See specification section 016400 OFCI

END OF SECTION 07 62 00

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

1. GENERAL

1. RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

2. SUMMARY

A. Section Includes:

1. Manufactured through-wall flashing with counter flashing.
2. Formed low-slope roof sheet metal fabrications.
3. Formed wall, coping, and soffit sheet metal fabrications.
4. Formed equipment support flashing
5. Surface mounted counter flashing
6. Manufactured reglets and counter flashing
7. Formed gutter and downspouts

B. Related Requirements:

1. Division 06 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 "Membrane Roofing" for materials and installation of sheet metal flashing and trim integral with roofing.
3. Division 07 "Metal Roofing" for materials and installation of sheet metal flashing and trim integral with roofing.
4. Division 07 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

3. COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak proof, secure, and noncorrosive installation.

4. PREINSTALLATION MEETINGS

- A. Pre Installation Conference: Conduct conference at Project site.
 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

5. SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter flashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 3 inches per 12 inches

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.

6. INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Sample Warranty: For special warranty.

7. CLOSEOUT SUBMITTALS

- A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

8. QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

9. DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

10. WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: **20** years from date of Substantial Completion.

2.PRODUCTS

1. PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. SPRI Wind Design Standard: Manufacture and install roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Drawings.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2. SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
 - 2. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 3. Color: Match Architect's sample
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

3. UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 45 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 1. The Garland Company Inc., 3800 E. 91st Street Cleveland OH 44105; R-Mer Seal self-adhering underlayment.
 - 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 - 3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

4. MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Zinc-Tin Alloy-Coated Stainless-Steel Sheet: Series 300 stainless steel.
- C. Solder:
 - 1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

5. FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.
- G. Do not use graphite pencils to mark metal surfaces.

6. ROOF-DRAINAGE SHEET METAL FABRICATIONS

- A.** Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than dimension indicated on Drawings. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
1. Gutter Profile: Style B according to cited sheet metal standard.
 2. Expansion Joints: Butt type with cover plate.
 3. Accessories: Continuous, removable leaf screen with sheet metal frame and hardware cloth screen at each downspout location.
 4. Gutters with Girth up to 15 Inches: Fabricate from the following materials:
 - a. Galvanized Steel: 22 gauge thickness.
- B.** Downspouts: Fabricate downspouts per plans and details or per size per CA plumbing code. Fabricate from the following materials unless otherwise shown on drawings.
1. Galvanized Steel: 22 gauge thickness.
- C.** Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim, and built-in overflows. Fabricate from the following materials:
1. Galvanized Steel: 22 gauge thickness.

7. WALL SHEET METAL FABRICATIONS

- A.** Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- long, but not exceeding 12-foot long, sections, under copings, and at shelf angles. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings; and form with 2-inch high, end dams. Fabricate from the following materials:
1. Galvanized Steel: 22 gauge thickness.
- B.** Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend **4 inches** beyond wall openings. Form head and sill flashing with 2-inch high, end dams. Fabricate from the following materials:
1. Galvanized Steel: 22 gauge thickness.
- C.** Wall Expansion-Joint Cover: Fabricate from the following materials:
1. Galvanized Steel: 22 gauge thickness.

8. MISCELLANEOUS SHEET METAL FABRICATIONS

- A.** Gutters: Fabricate from the following materials:
1. Pre-Finished Steel: 22 gauge thickness.

- B. Downspouts: Fabricate from the following materials:
 - 1. Steel: Schedule 40
- C. Edge Metal / Gravel Stop: Fabricate from the following materials:
 - 1. Pre-Finished Steel: 24 gauge thickness.
- D. Cleat Flashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 22 gauge thickness.
- E. Curb Covers / Pans: Fabricate from the following materials:
 - 1. Galvanized Steel: 22 gauge thickness.
- F. Scuppers: Fabricate from the following materials:
 - 1. Galvanized Steel: 22 gauge thickness.
- G. Equipment Support Flashing: Fabricate from the following materials:
 - 1. Galvanized Steel: 22 gauge thickness.
- H. Overhead-Piping Safety Pans: Fabricate from the following materials:
 - 1. Galvanized Steel: 22 gauge thickness.

3.EXECUTION

1. EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

2. UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side

edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

- B. Apply slip sheet, wrinkle free, directly on substrate before installing sheet metal flashing and trim.

3. INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of **10 feet** with no joints within 24 inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

- F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints:** Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel sheet.
 2. Do not pre-tin zinc-tin alloy-coated stainless steel.
 3. Do not use torches for soldering.
 4. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
 5. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
 6. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.
 7. Copper-Clad Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for copper-clad stainless steel.
- H. Rivets:** Rivet joints in zinc where necessary for strength.

4. ROOF-DRAINAGE SYSTEM INSTALLATION

- A. General:** Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters:** Join sections with riveted and soldered joints or joints sealed with sealant as shown and specified on drawings or summary/scope of work. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.
1. Fasten gutter spacers to front and back of gutter.
 2. Anchor and loosely lock back edge of gutter to continuous cleat, eave or apron flashing.
 3. Anchor back of gutter that extends onto roof deck with cleats spaced not more than 24 inches apart.
 4. Anchor gutter with gutter brackets and straps spaced not more than 24 inches apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.
 5. Anchor gutter with spikes and ferrules spaced not more than 24 inches apart.
 6. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.
 7. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.
- C. Conductor Heads:** Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch below gutter discharge.

- D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints minimum of 4 inches in direction of water flow.

5. ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.
- C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.
 - 1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
 - 2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.
- D. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.
- E. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- F. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of interlocking folded seam or blind rivets and sealant, anchor and washer at 36-inch centers unless otherwise indicated.
- G. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

6. WALL FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry." Section 092400 "Cement Plastering."
- C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

7. MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.
- B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

8. ERECTION TOLERANCES

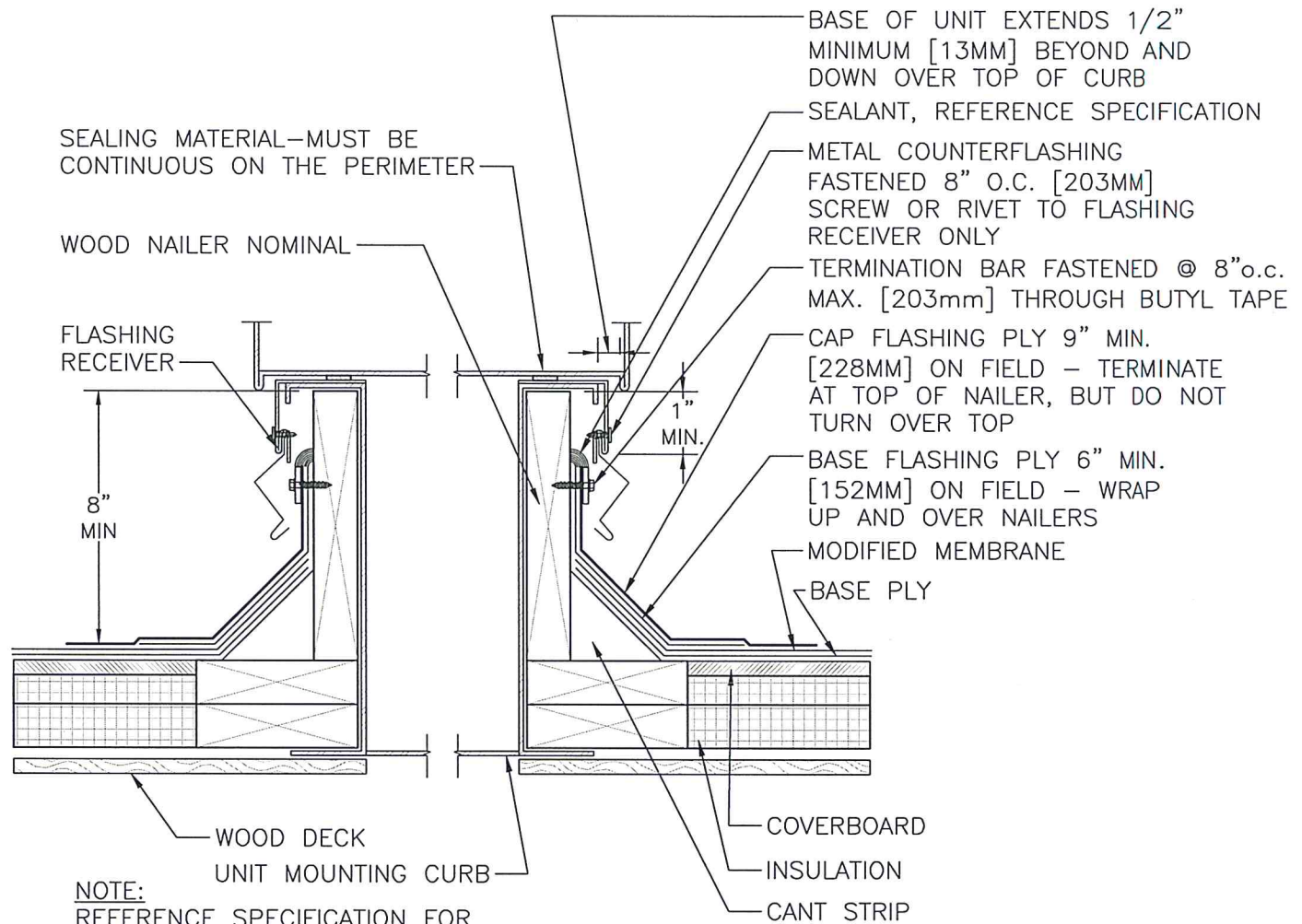
- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

9. CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

Bid No.020121



NOTE:
REFERENCE SPECIFICATION FOR
SURFACING, MEMBRANE ADHESIVE TYPE,
AND INSULATION/COVER BOARD TYPE
AND ATTACHMENT METHOD.

DRAWINGS ON 8 $\frac{1}{2}$ "x11 TITLE BLOCKS ARE NOT TO SCALE.

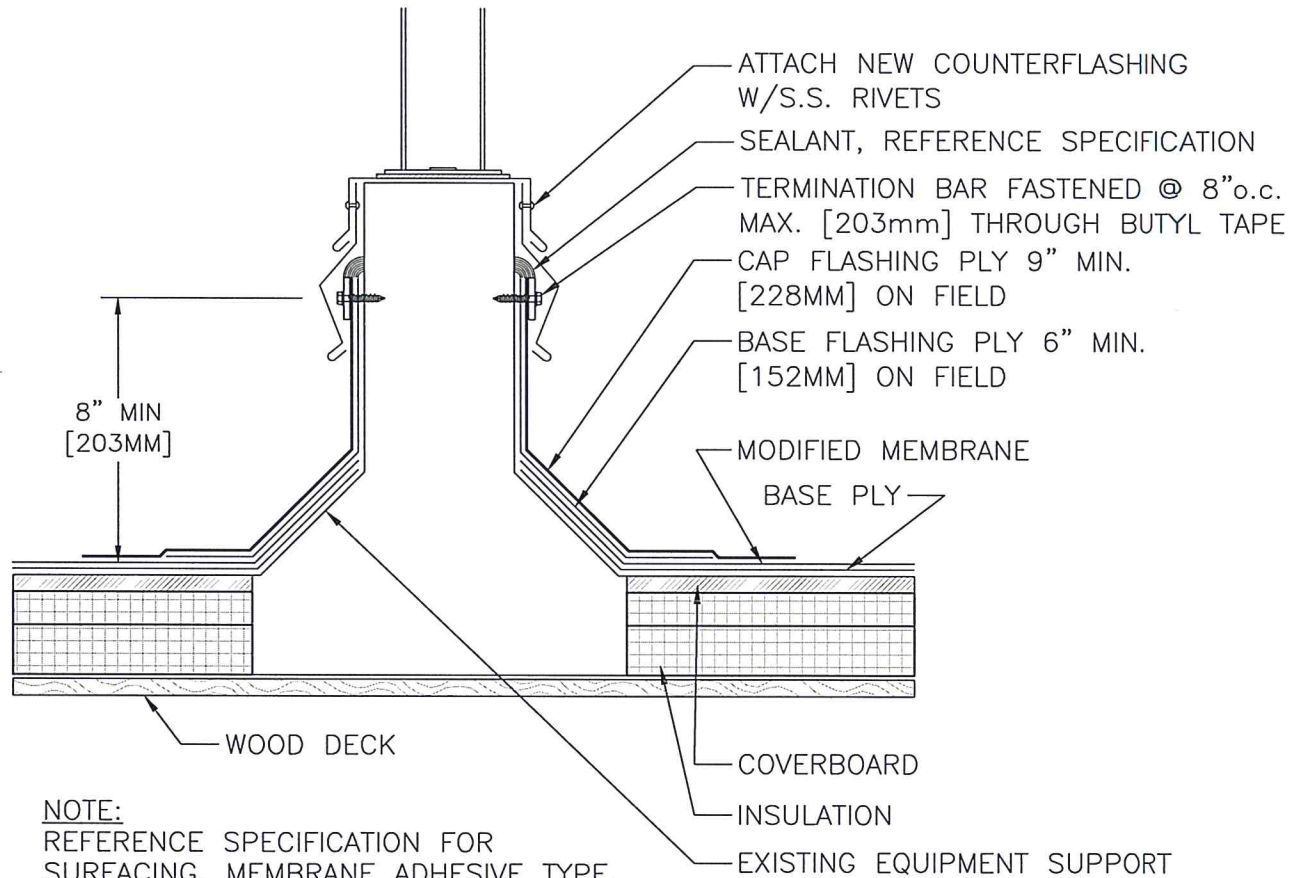
CURB DETAIL / AIR HANDLING STATION



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EQUIPMENT SUPPORT - PREMANUFACTURED - EXISTING



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COPING COVER X 10'-0"
 SLOPE PER SPECIFICATION
 6" CONCEALED SPLICE PLATE
 @ EACH JOINT
 16 GA. ANCHOR CHAIR
 (4) FASTENERS PER ANCHOR CHAIR
 SA HIGH TEMP UNDERLAYMENT
 2" MIN
 2" MIN
 CAP FLASHING PLY
 9" MIN. [228mm] ON FIELD
 BASE FLASHING PLY
 6" MIN. [152mm] ON FIELD -
 WRAP UP AND OVER NAILER
 NAIL SA HT UNDERLAYMENT
 AND PLIES TOGETHER

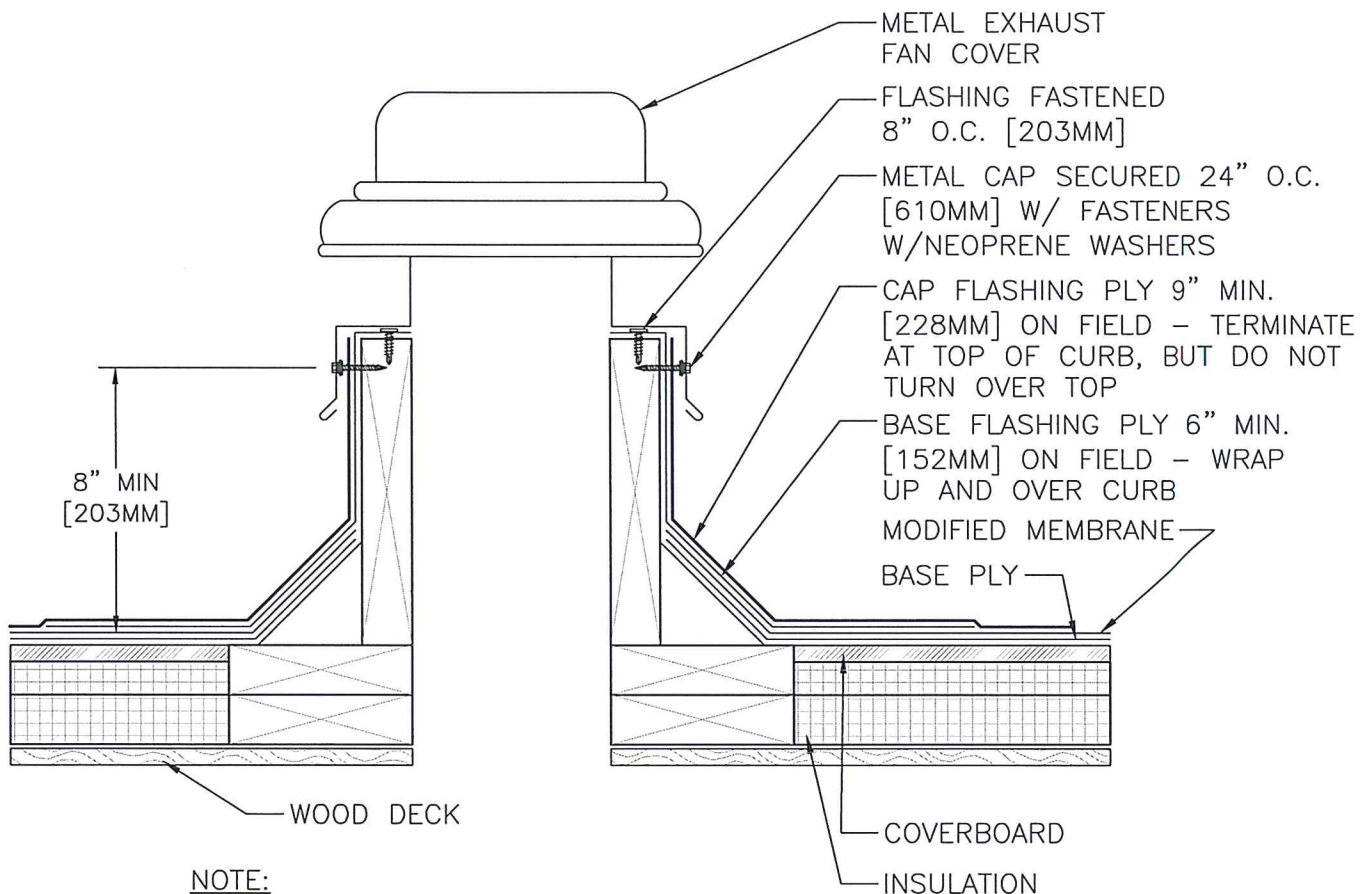
NOTE:
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COPING CAP AT MASONRY WALL



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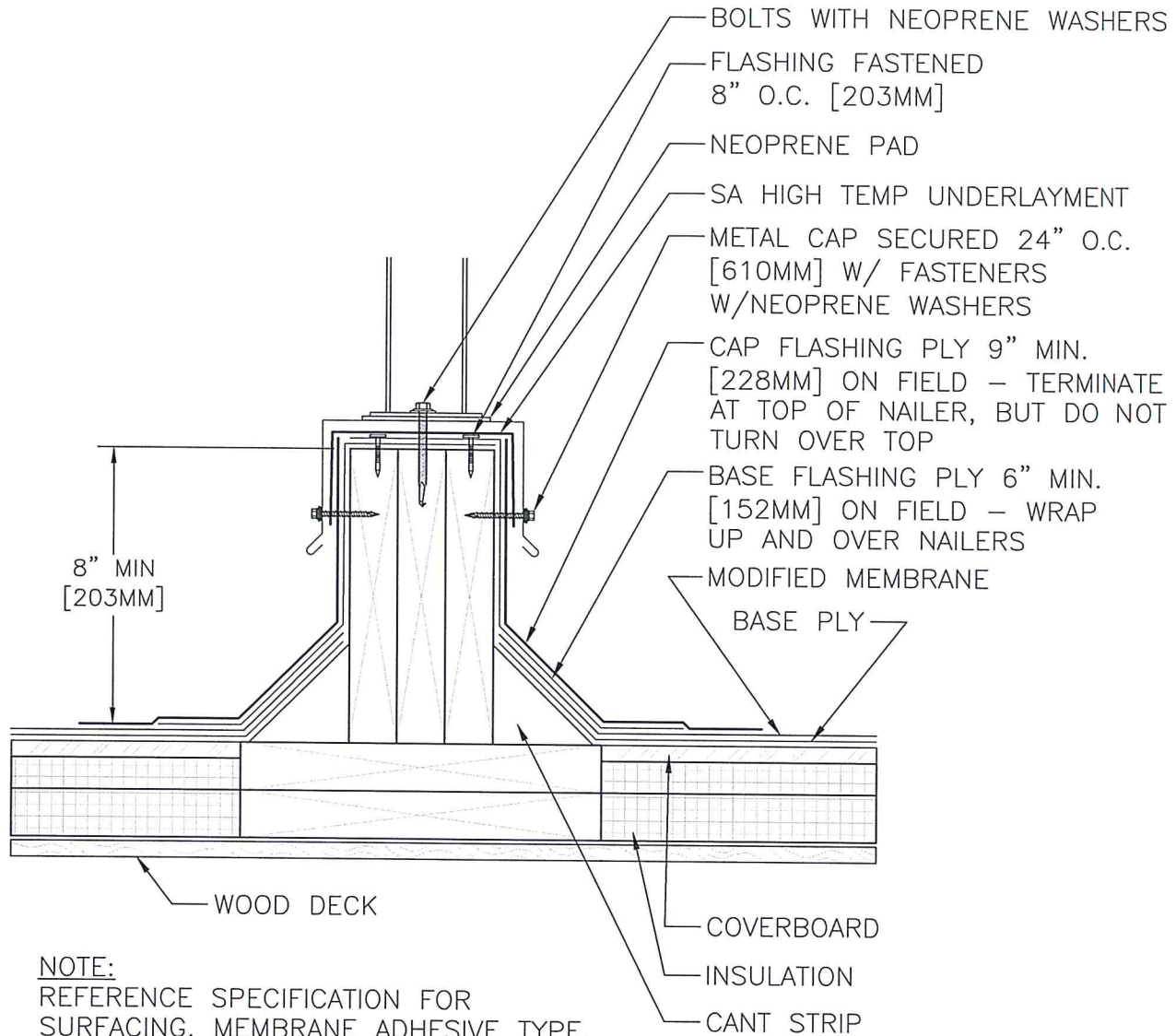
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EXHAUST FAN



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EQUIPMENT SUPPORT - NEW CONSTRUCTION

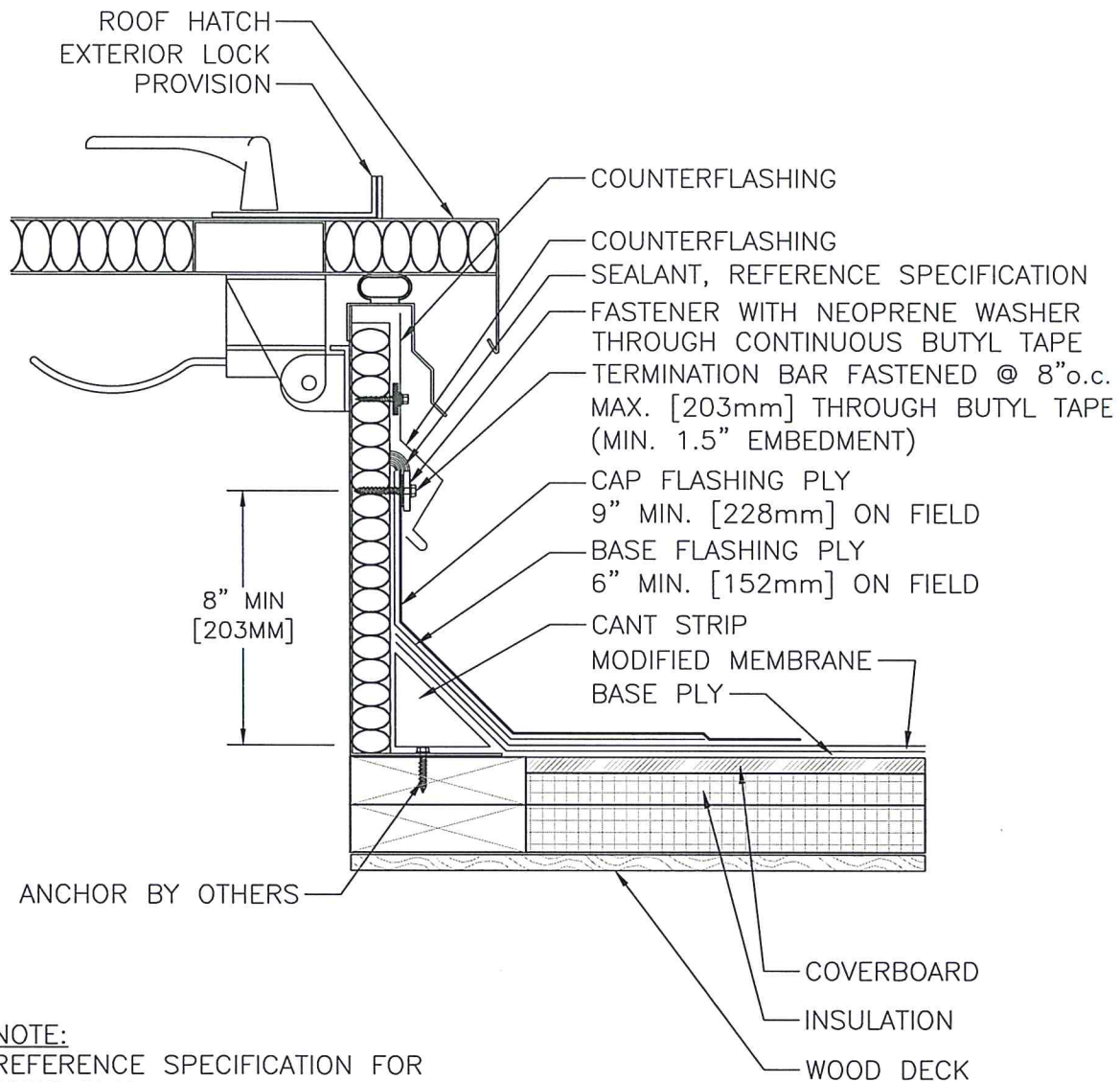


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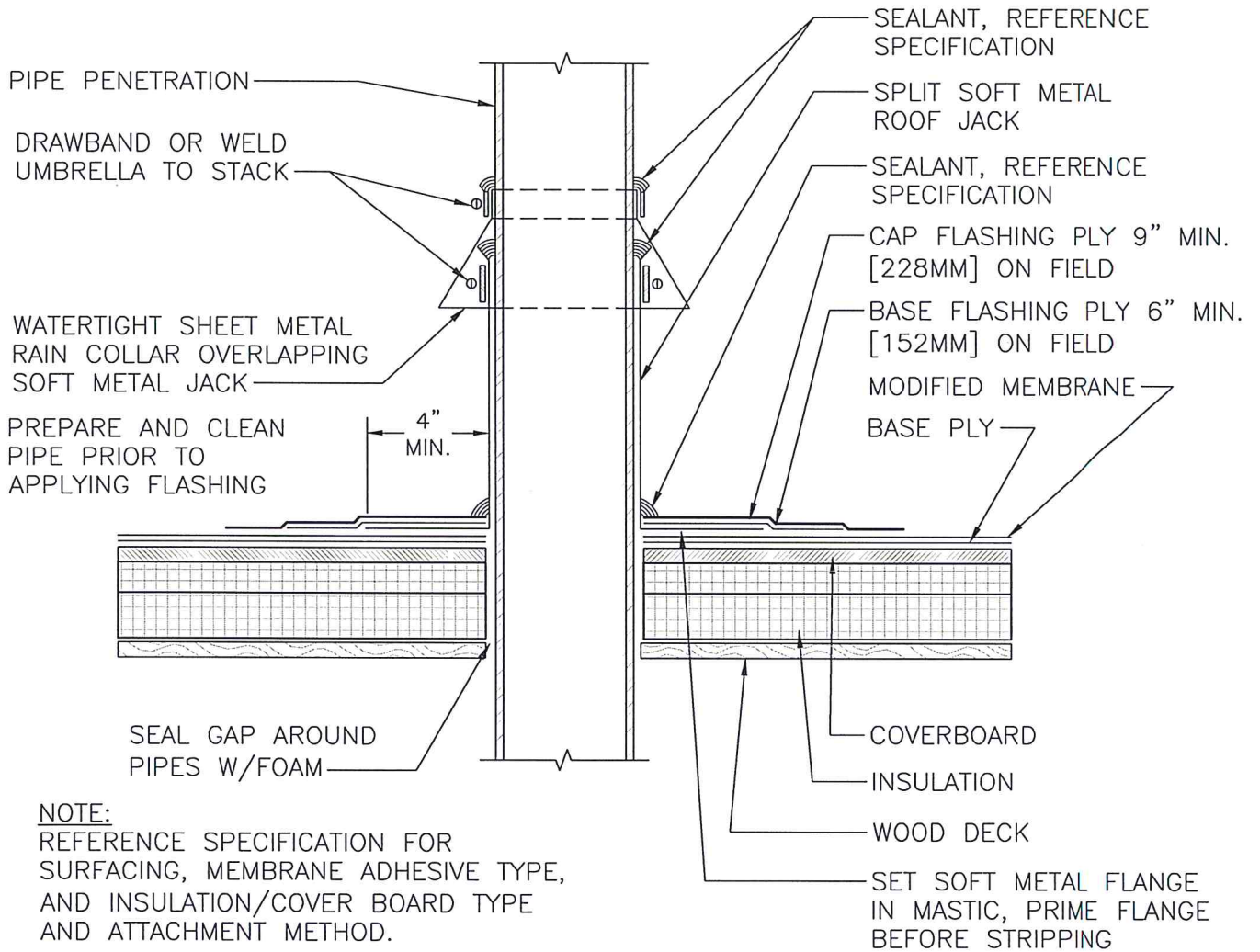
HATCH DETAIL



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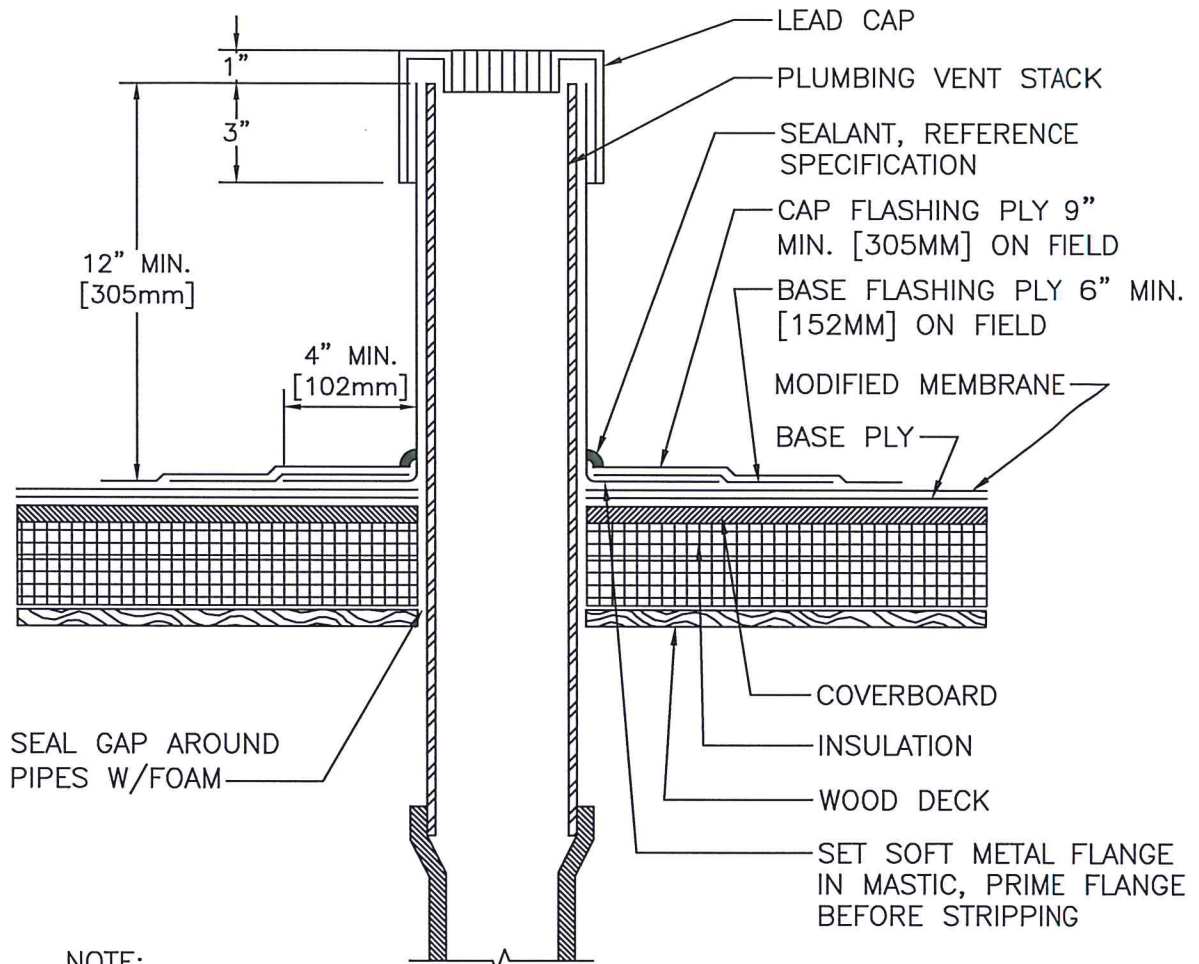
PIPE/TUBE PENETRATION - SPLIT JACK w/COLLAR



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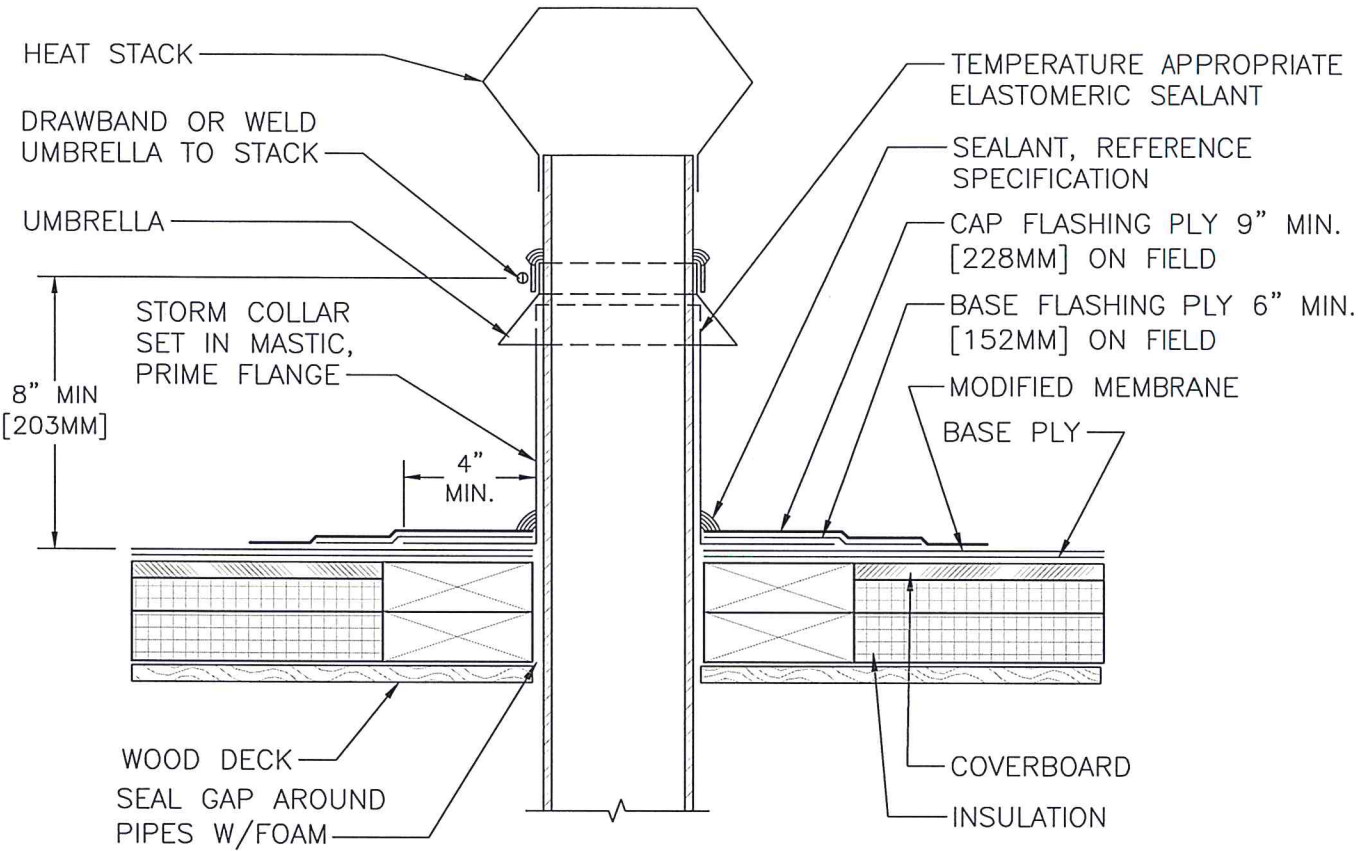
PLUMBING STACK



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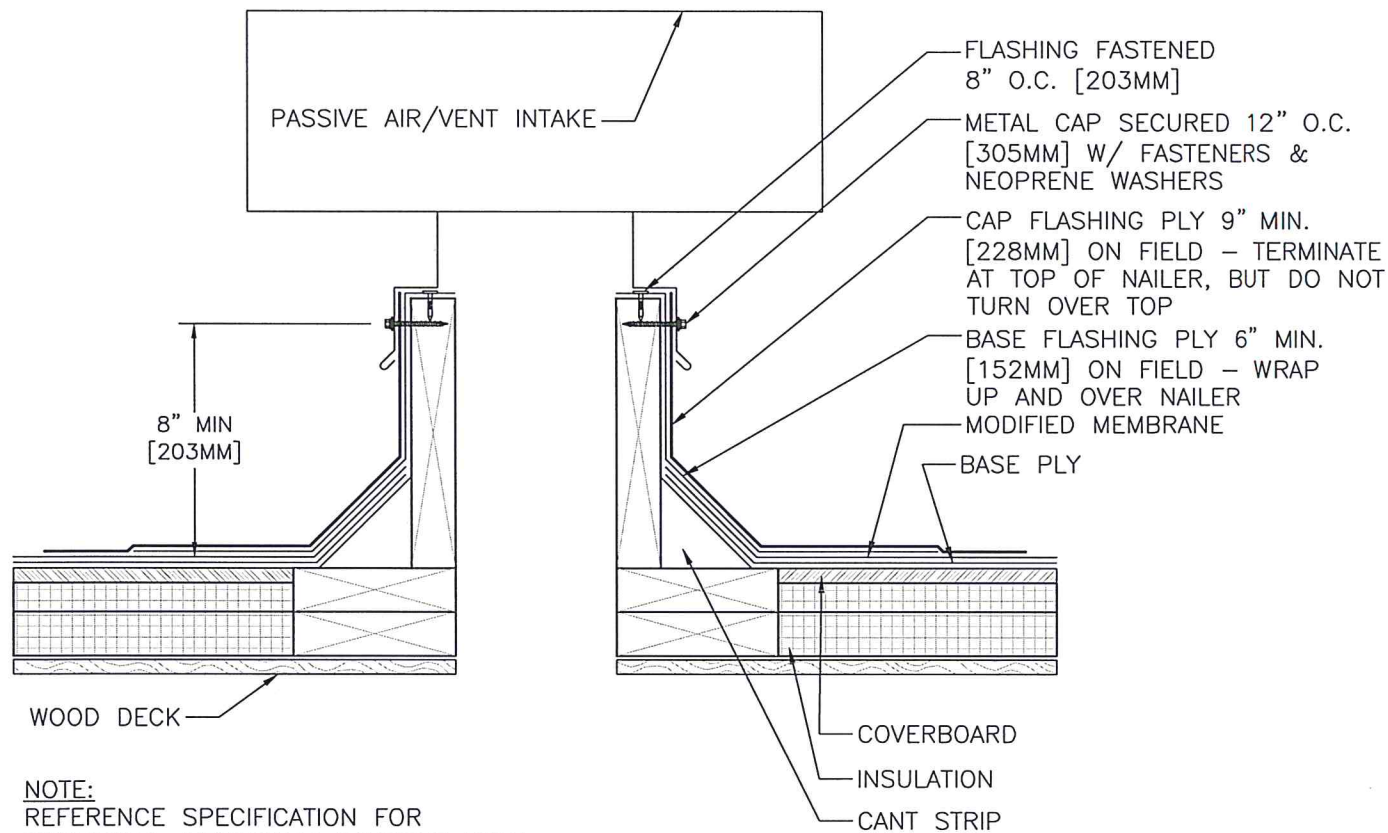
NOTE:
REFERENCE SPECIFICATION FOR
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HEAT STACK

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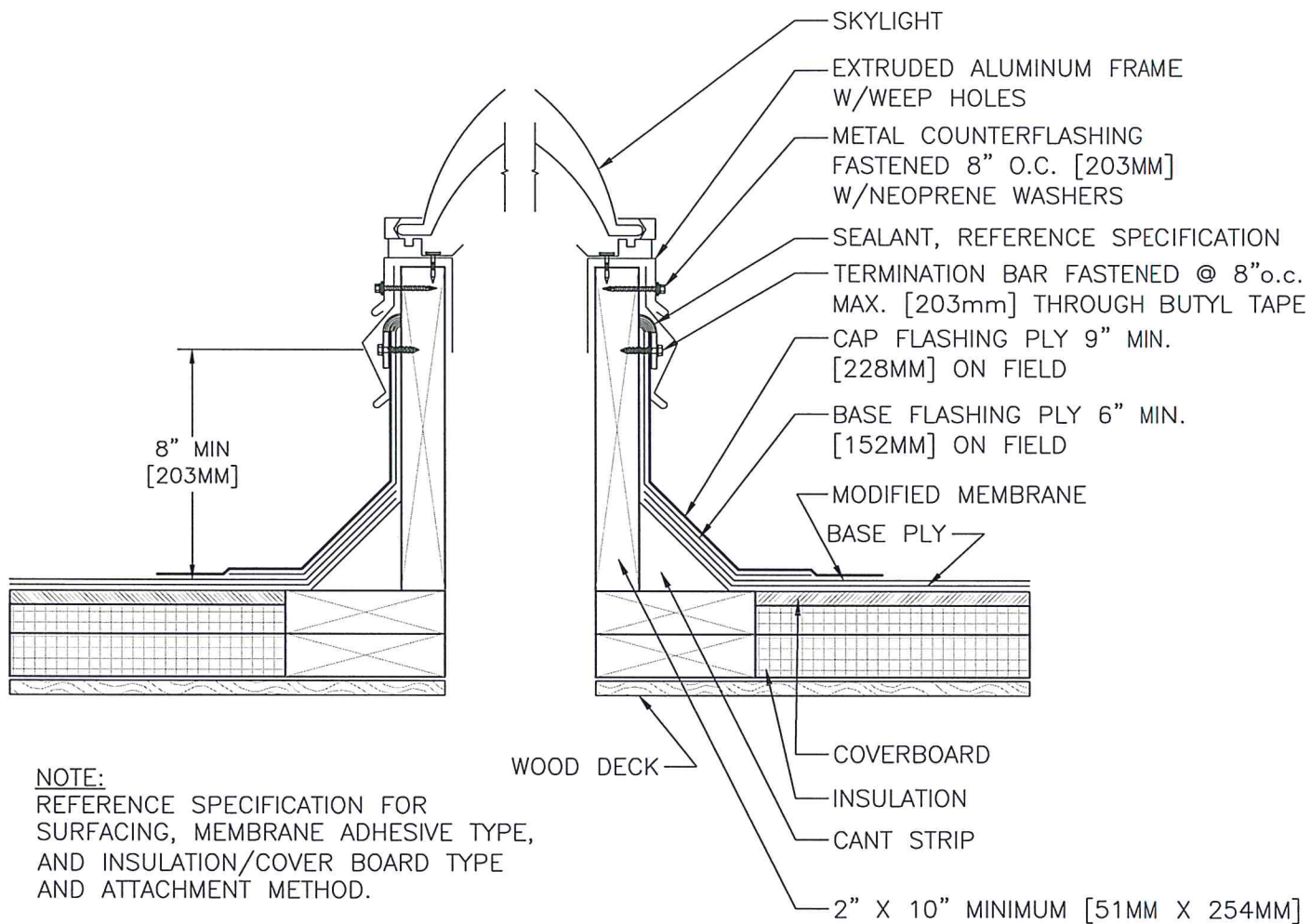
PASSIVE AIR / VENT INTAKE



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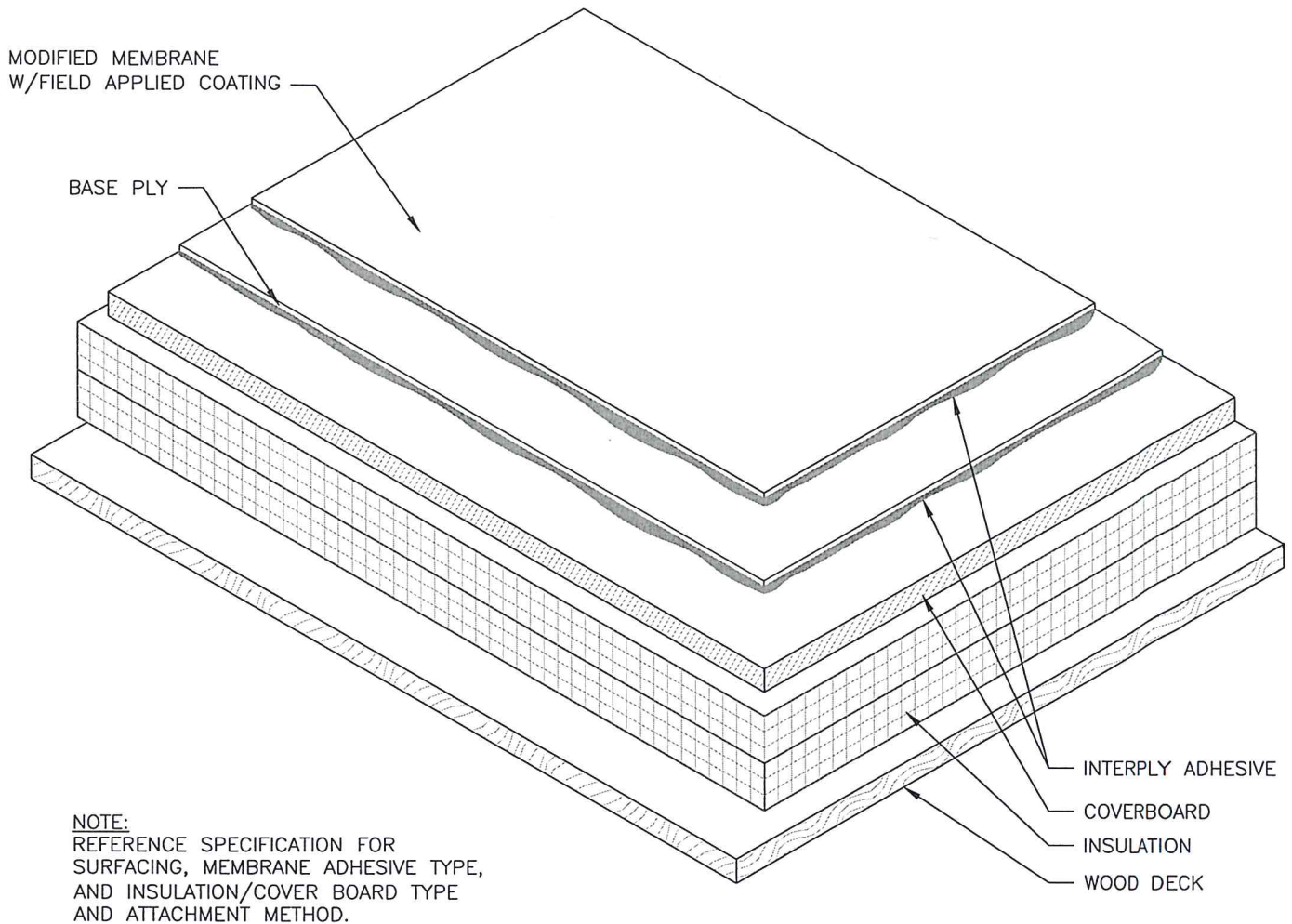
SKYLIGHT



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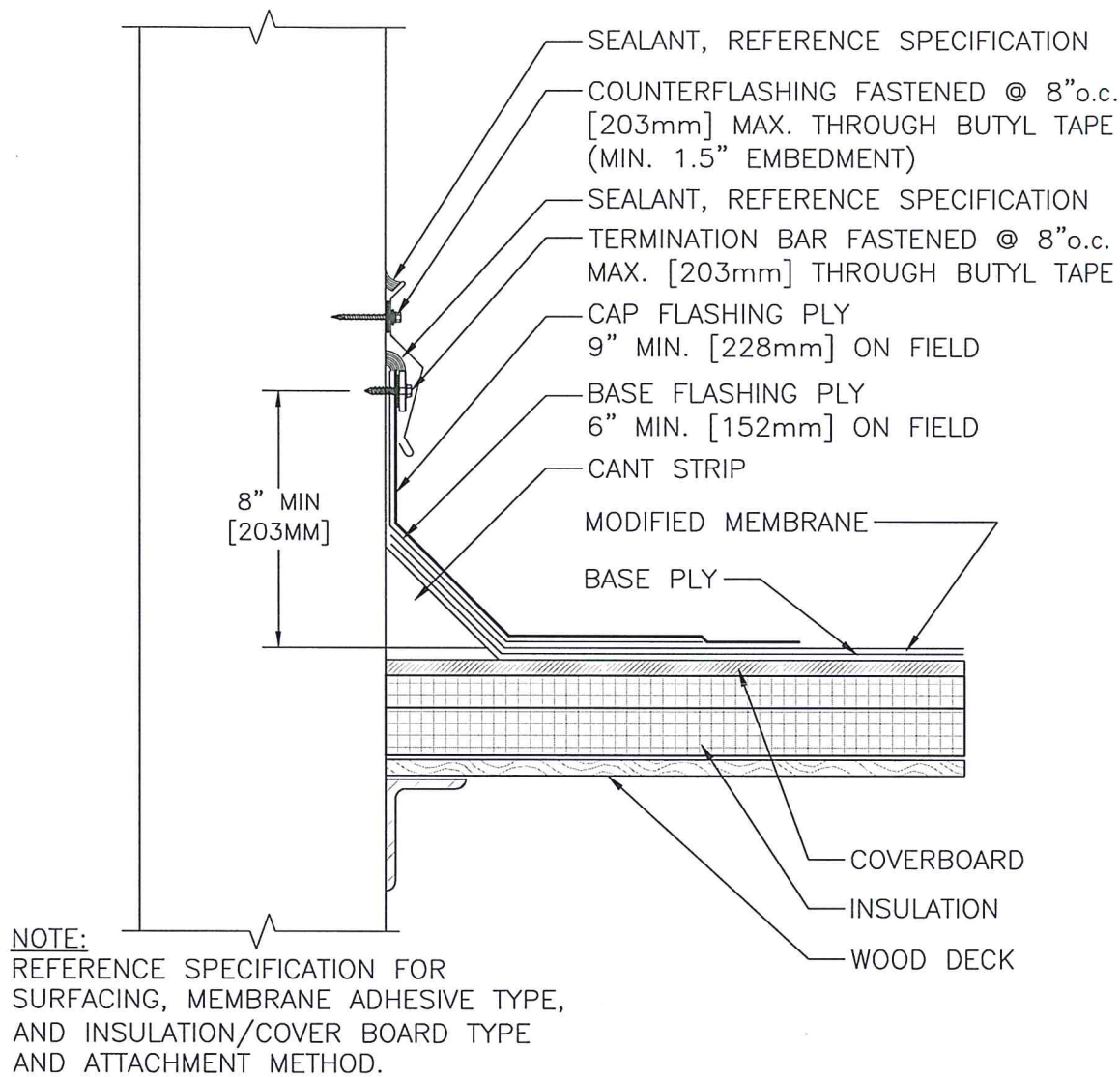
TYPICAL ROOF SYSTEM - COATED SURFACE



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WALL FLASHING - SURFACE MOUNTED COUNTERFLASHING

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	REPRESENTATIVE:		
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