



IRS

Industrial Roofing Services, Inc.

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SPECIFICATIONS

for

ROOF REPLACEMENT PROJECT

CITY HALL ANNEX

ROOF AREAS 8 & 9 / IRS JOB# 17075

Located at

800 CENTER STREET

RACINE, WISCONSIN

Prepared for

Mr. Thomas Eeg, P.E.

Assistant Commissioner of Public Works / Operations

City of Racine

730 Washington Avenue

Racine, Wisconsin 53403

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 PROJECT OVERVIEW

- A. The Work consists of roofing replacement on Roof Areas 8 & 9 at City Hall Annex in Racine, Wisconsin for the City of Racine.
- B. The specification is based on **Carlisle, Firestone, or Versico 60-mil EPDM roof system with a ten (10) year total system warranty**. Contractor's wishing to use a system from another roof system manufacturer must gain prior approval, per the specified substitution request requirements.
- C. The Work includes related sheet metal and carpentry work.
 - 1. New nailers and sheet metal along perimeter edges, per the Construction Drawings.
- D. The Owner will not be responsible for any works associated with this project.

PART 2 - PRODUCTS

2.01 SYSTEM COMPONENTS

- A. Insulation system:
 - 1. Polyisocyanurate insulation (flat-stock and tapered).
 - a. Bead-applied foam insulation adhesive
 - 1) Summer grade or winter-grade, as needed depending on weather conditions
 - 2) Prime existing deck prior to use, if required by the manufacturer
- B. Fully-adhered EPDM single-ply roof system:
 - 1. 60-mil unreinforced EPDM single-ply roof membrane.
 - 2. Reinforced perimeter securement strips.
 - 3. Membrane bonding adhesive.
- C. Roof flashings:
 - 1. Cured EPDM single-ply membrane (base flashings).
 - 2. Semi-cured EPDM single-ply strip-in flashing (metal flange strip-in).
 - 3. Uncured EPDM single-ply membrane (details - corners, flanges, etc.).
 - 4. Prefabricated EPDM boot flashings (pipe flashings).
 - 5. Membrane cleaner and splice tape.
 - 6. Membrane splice and bonding adhesives.
- D. Miscellaneous:
 - 1. Membrane adhesives and sealants.
 - 2. Membrane fastening plates and screws.
- E. Dimensional lumber and exterior-grade plywood (nailers and blocking).
- F. 24 gauge prefinished galvanized sheet metal.
- G. Extruded aluminum termination bar with caulking cup.

- H. Miscellaneous fasteners.
- I. Miscellaneous sealants and tape caulk.

2.02 COMPONENTS SUPPLIED BY OWNER

- A. None.

PART 3 - EXECUTION

3.01 WORK PERFORMED BY CONTRACTOR

- A. Remove the existing roof membrane, insulation, flashings, and perimeter metal down to the existing substrate.
- B. Clean the exposed deck of all debris. Scrape and clean any residual asphalt bitumen from the concrete deck as much as possible.
- C. Install new wood nailers and blocking where shown or required by the Construction Drawings.
- D. Install the specified insulation (flat stock and tapered) to the roof deck using in the specified bead-applied foam insulation adhesive.
 - 1. **Maximum bead spacing: 4-inches on center.**
 - 2. Summer grade or winter-grade adhesive, as needed depending on weather conditions
 - 3. Prime existing deck prior to using foam adhesive, if required by the manufacturer
- E. Mechanically attach reinforced perimeter securement strips at all perimeters.
- F. Adhere the EPDM single-ply roof membrane to the completed insulation in a continuous and uniform application of membrane bonding adhesive; adhere to the perimeter securement strips with splice adhesive.
- G. Thoroughly clean all membrane and flashing laps; join membrane laps with splice tape. Thoroughly inspect all laps daily after installation for signs of improper bonding. Apply lap sealant to all seams on the same day as completion.
- H. All perimeters and projections are to be constructed and flashed in strict accordance with the Construction Drawings provided.

3.02 INCLUSIONS

- A. The Contractor shall include, in his bid, any and all costs incurred in complying with the intent of the Construction Drawings. This shall include, but not be limited to:
 - 1. Handling, disconnection, and re-connection of rooftop equipment – crane costs, electrical work, ductwork, and mechanical line extensions, temporary storage, etc.
 - 2. Re-working of existing, interior drainage piping due to drain head adjustments or removal of sump pans – connectors, accessories, and pipe insulation.
 - 3. Re-working of or the replacement of existing drain assembly components.

END OF SECTION

SECTION 01025

APPLICATIONS FOR PAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section describes the procedures and submittal requirements regarding Change Orders and Application for Payment requests to the Owner.

1.02 PROGRESS PAYMENTS

- A. Change Orders:
1. The Contractor shall be responsible for initiating the request for Change Order, on the forms provided by or acceptable to the Consultant, to include:
 - a. A summary of the approved Unit Pricing (include copies of approved Unit Pricing forms), on a weekly basis.
 - b. A description of the approved change in the Work, within one (1) week of initiation.
 2. The Consultant will review the Change Order requests and forward them with his recommendation to the Owner; copies approved by the Consultant and Owner will be returned to the Contractor.
 3. The Contractor shall submit the approved Change Order forms in conjunction with an Application for Payment form, including the total of the approved Change Orders.
 4. Change Orders shall be considered valid only if:
 - a. Submitted in writing on the proper Change Order form.
 - b. Approved by signatures of both the Consultant and the Owner.
- B. Application for Payment:
1. The Contractor shall submit:
 - a. Completed Application for Payment, on standard AIA formats or on Owner's required forms.
 - b. Contractor's original invoice.
 - c. Subcontractor's material and/or labor Waivers of Lien, where applicable, to match the amount requested.
 - d. Written justification for payment of materials not in-place by means of supplier invoices, bills of lading, Waivers of Lien, etc.
 2. The Contractor shall submit Application for Payment, on a periodic basis or as determined in the Agreement, to:

Industrial Roofing Services, Inc.
Attn: kimw@irsroof.com
13000 West Silver Spring Drive
Butler, WI 53007

3. The Consultant shall review the Application for Payment and either:
 - a. Approve the requested amount as a representation that the Work has progressed to the point indicated and, that to the best of his knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents, or;
 - b. Revise the amount requested to an amount for which he is able to make such representation to the Owner.
 - c. Notify the contractor in writing of the rejection of the application due to error and/or incompleteness
4. Payments will be reviewed, approved, and submitted to the Owner with the Consultants recommendations on a timely basis.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

SECTION 01030

ALTERNATES, ALLOWANCES, AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section identifies each voluntary and/or mandatory Alternate, by number, and describes the basic changes to be incorporated into the Work; only if that Alternate is made a part of the Work by acceptance by the Owner in the Agreement.
 - 1. A Mandatory Alternate Bid shall be in addition to the Base Bid. It may contain some or all aspects of the Base Bid, except those changes specifically described herein.
 - 2. An Alternate Bid shall be in lieu of the Base Bid. It shall contain all aspects of the Base Bid, except those changes specifically described herein.
 - 3. An Alternate Add or Alternate Deduct, as described herein, shall add work to, or deduct work from, the Base Bid.
- B. This section also includes the Contractor's options in selecting products or requesting the acceptance of substitute products.
- C. This section also specifies Allowances – monetary amounts (or materials) to be included in the Contractor's bid prices – which will be used to cover change orders, unit pricing, deteriorated material replacement and/or other intangibles during the course of the Work.

1.02 RELATED REQUIREMENTS

- A. Bidding Documents: Method of quotation for each Alternate, and the basis of the Owner's acceptance of Alternates.
- B. Referenced sections of these specifications, or drawing details, which stipulate the products and methods necessary to achieve the Work for each Alternate, as described below.
- C. Coordination of related work and modification of surrounding work of the Base Bid, as required to properly integrate the work of each Alternate, to provide the Work as required by the Contract Documents.

1.03 DESCRIPTION OF ALTERNATES

- A. None.

1.04 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Contractor's product options:
 - 1. If products are specified only by reference standard, any product which meets that standard, by any manufacturer, shall be used.
 - 2. If several products are specified by name or manufacturer, any of the listed products may be used.
 - 3. If only one product is specified by name or manufacturer, that product shall be used, or the Contractor shall submit a request for substitution, as specified below, for a product that meets or exceeds the quality standards of the listed product.
 - 4. If the product list is followed by "Approved equal", the Contractor may use any of the listed products or shall submit his "or equal" for consideration, following the substitution procedure, as specified below.

- B. Substitutions:
1. During the Bidding process, the Consultant may consider written requests from Bidders for substitute products in place of those specified. If the Consultant deems the substitute product to be worthy of approval, it will be incorporated as such into an Addendum to all Bidders. Requests for substitutions shall include data as listed below and must be submitted at least five (5) business days prior to the bid due date.
 2. After Contract Award, the Consultant will consider written requests for "or equal" product substitutions in place of those specified. Such requests must be submitted with the product list submittals. Approval of the submittal package shall constitute approval of proposed substitute products. Requests for substitutions shall include the data listed below.
 3. Submit substitution requests, supported with complete data, drawings and/or appropriate samples as necessary to show compliance with the intent of the Contract Documents, including:
 - a. Product description, performance, and test data, and applicable reference standards.
 - b. If applicable, a letter from a substitute manufacturer that indicates the following:
 - 1) The manufacturer has reviewed and approved the specifications and drawings, as they relate to the use of their products.
 - 2) The manufacturer confirms the specified system (including requirements of the drawings, installation methods specified, and other products) is acceptable to the manufacturer.
 - 3) Upon installation of the specified system, by an approved applicator, the manufacturer will issue the specified warranty.
 - c. Name, address, date of installation and Owner contact of similar projects on which the product was used.
 - d. Changes required in other elements of the Work as a result of the incorporation of the substitute product.
- C. Contractor's representation: a request for substitution constitutes a representation that the Contractor:
1. Has investigated and determined that the proposed substitute product is equal or superior, in all respects, to the specified product.
 2. We will provide the same warranty as specified if substitute products are utilized.
 3. Will coordinate the incorporation of the proposed substitution in the Work
 4. Will modify other portions of the Work, as may be required, to complete the project in accordance with the intent of the Contract Documents.
 5. Waive all future claims for added costs to the Contract, over and above those approved by the Owner that may be caused by the use of the substitute product.
- D. Substitutions will not be considered if:
1. They are indicated or implied on shop drawings or product data submittals, except as described above.
 2. The substitute product is considered, in the opinion of the Consultant, to be outside of the general classifications of the specified product.
 3. Approval of the substitution would require substantial revisions to the Contract Documents.
- E. The contractor shall not order or install substitute products without Written Notice of Acceptance of the request for substitution by the Consultant and the Owner. Submission of the Substitution Request Form does not in any way constitute approval. If the substitution is not approved, the rejection shall be considered final and the Contractor shall furnish a specified product.

1.05 ALLOWANCES

- A. None.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section provides information regarding the Consultant's scheduled project meetings.

1.02 PRE-BID MEETING

- A. If required by Ownership, a pre-bid meeting will be held, at the project site, at the time designated in the invitation to bid or advertisement.
- B. Representatives of all prospective Bidders shall meet with the Consultant to review the existing conditions on the project site.
- C. The Consultant will, at a minimum, address the following items at the pre-bid meeting:
 - 1. Introduction of key project personnel;
 - 2. The general project scope, including roof walkover;
 - 3. The requirements of Section 00100 – "Instructions to Bidders";
 - 4. The bid(s) to be included;
 - 5. The Bid due date;
 - 6. The Owner's intended project construction schedule;
 - 7. Required project warranties;
 - 8. Presence of regulated materials and any special requirements;
 - 9. Anticipated construction facilities:
 - a. Use of the site and restrictions, if any;
 - b. Temporary services and controls.

1.03 PRE-CONSTRUCTION CONFERENCE

- A. Within ten (10) days after Consultants receipt and approval of required project submittals Contractor shall provide a Consultant with written notice of his intent to start the work.
- B. Within ten (10) days after receipt of Contractors written a notice of his intent to start the work Consultant will schedule a formal pre-construction conference to be held at the project site, at a time designated by the Consultant.
- C. Representatives of the Contractor and his subcontractors, including the project superintendent and foreman, shall attend the pre-construction conference with the Consultant and a representative of the Owner.
- D. The Consultant will, at a minimum, address the following items at the pre-construction meeting:
 - 1. Designation of key personnel and their duties;
 - 2. The channels for project communication;
 - 3. Review of the Project Scope of Work;
 - 4. The anticipated project construction schedule, showing timeframe for the start and completion of each portion of the Work;
 - 5. Review of the material list (Contractor shall provide an updated list of changes were made from initial submittal);
 - 6. Review of sequencing for critical areas of the Work;
 - 7. The requirements for approving and processing of Unit Pricing and Change Orders;

8. Job site conditions and requirements:
 - a. Use of site and restrictions;
 - b. Temporary services and controls;
 - c. Existing facilities and maintenance of operation;
 - d. Daily completion procedures, such as night seals;
 - e. Emergency weather-seal protections;
9. Notification procedures;
10. Expectations of the Owner and IRS;
11. Quality control of the new roofing installation.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section provides requirements for project submittals and guidelines for submittals, by the Contractor or his Subcontractor, of shop drawings and other submittals as requested in the Project Documents.

1.02 SUBMISSION REQUIREMENTS

- A. Submittals listed below shall be delivered to the Consultant as soon as possible after Contract Award, but no later than ten (10) days prior to Contractor's intent to start work, and/or a minimum of five (5) days before approval is needed to order materials.
- B. Accompany submittals with a transmittal letter, containing:
1. Date.
 2. Project title and IRS Job number.
 3. Contractor's name and address.
 4. Notification of deviations from Contract Documents, if any.
- C. Required Submittal items:
1. Insurance Certificate: Original copy, with the Owner as the certificate holder and the Consultant (and any other entities specified) named as Additional Insureds.
 2. Performance Bond: If required in the Bidding Documents (or if requested by the Owner after the bid), provide the original, sealed copy for the Owner.
 3. Materials: **List** of major products proposed for use, with the name of manufacturer, trade name or model number of product or materials (final list may be provided at the pre-construction meeting if changing between specified products). Submit product data sheets, printed information, installation instructions, catalog cuts, or material color charts.
 4. Safety Data Sheets: Provide copies of SDS for each product that will be brought on-site.
 5. Project Schedule: Provide a breakdown of the project schedule timetable by **each major portion** of the work. As a minimum, include start and completion dates for each required task.
 6. Schedule of Values: Provide a breakdown of the project cost by **each major portion** of the Work such as mobilization, tear-off/temporary roof, insulation/membrane, flashings, sheet metal, etc. **DO NOT** list only roofing material and roofing labor.
 7. Sheet Metal Color Charts: Original, standard color charts, for selection by the Owner. This selection may not be made during the submittal approval process.
 8. Manufacturer's Certification: Submit a letter from the manufacturer stating their intent to warrant the project, as specified, including certification of the Contractor's standing as a licensed applicator of the specified roof system.
 9. Warranty: Submit a sample copy of the applicable manufacturer's warranty as well as a copy of the completed application for the warranty.
 10. Project Contacts: Provide all necessary contact numbers (cellular, pager, etc.) for key personnel involved in the project. Include an after-hours contact name and home telephone number in case of emergency. Also provide subcontractors' names, addresses, contact names, and phone/fax numbers, if applicable.

1.03 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall review the product data and samples prior to submission. The Contractor shall initial, sign, or stamp the submittals to certify his review and acceptance.

- B. Verification of existing field measurements and conditions is the SOLE responsibility of the Contractor.
- C. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Consultant's review or acceptance of submittals.
- D. Clearly indicate, in the submittals, any deviations from the requirements of the Project Documents caused by acceptance of substitutions, negotiations with the Owner after the Bid, etc. Any changes to the Project Documents must be confirmed by written Change Order.
- E. The Contractor shall not begin work prior to receipt of the approved submittals from the Consultant.

1.04 DISTRIBUTION OF SUBMITTALS

- A. The Consultant will retain three (3) copies of approved or approved-as-noted submittals, two for IRS office use, and one for the Owner, and will return the remaining copies to the Contractor.
- B. The Contractor shall be responsible for distributing submittals that carry the Consultant's approval, as required for construction or fabrication, to the Project Superintendent, Subcontractors, and material suppliers or distributors.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section provides requirements for the standards of quality for materials and workmanship for this project.

1.02 GENERAL

- A. The Contractor shall maintain quality control over his employees, suppliers, manufacturer's products, services, and site conditions to produce work of specified quality.

1.03 WORKMANSHIP

- A. Comply with recognized industry standards, except where specifications indicate more rigid standards or more precise workmanship.
- B. Perform the Work with personnel qualified to produce workmanship of specified quality.

1.04 APPLICATION QUALITY CONTROL

- A. The Contractor shall be experienced in all aspects of the type of work being performed.
- B. The Contractor shall be approved, by the roof system manufacturer, to install the specified roof system prior to the commencement of the Work. The Contractor shall also be certified to procure the specified warranty.
- C. The Contractor's foreman shall, at all times, have a complete set of Project Documents, including specifications, drawings, MSDS sheets and approved submittals for his use and reference, on the project site. The foreman shall produce these Project Documents upon request of either the Owner or the Consultant. Failure to do so will result in a violation of Item 1.07 of this Section.

1.05 MANUFACTURER'S FIELD SERVICES

- A. The roof system manufacturer shall make available, upon request, qualified personnel to observe field conditions, conditions of surfaces and installation and quality of workmanship.
- B. The roof system manufacturer shall make qualified personnel available to make necessary recommendations during the course of the project and to perform a final review of the Work if requested.
- C. The manufacturer's representative shall submit a copy of his written report to the Consultant, listing observations and recommendations.

1.06 CONSTRUCTION OBSERVATION

- A. Construction observation shall be conducted by the Consultant on a periodic basis, as determined by agreement with the Owner. If the Contractor is cited for non-compliance with the specifications during the course of a site visit, all parties shall be notified with a copy of the observation report.

- B. In the event that the Contractor is cited for the same non-compliance item twice, or any three items total, the Owner may employ the Consultant to provide more frequent observation or full-time observation, to ensure compliance with the Project Documents. The cost of these additional visits may be deducted, in whole or in part, from the Contractor's final contract amount.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 01500

SITE CONDITIONS AND CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section provides requirements for the Contractor's operations at the project site, including the use of existing facilities and utilities, delivery and storage of materials and equipment and controls affecting work operations.

1.02 SECURITY AND ACCESS

- A. Security: follow the Owner's procedures and requirements, as established during the pre-construction conference.
- B. Maintenance of access and operations:
 - 1. During the performance of the Work, the Owner shall continue to perform his normal operations in the building. The Contractor shall maintain access to Owner-occupied areas at all times.
 - 2. Schedule demolition and roofing work with the Owner in such a manner as to allow his normal operations to continue without interruption.
- C. Maintenance of existing services:
 - 1. The Contractor shall, during the performance of the Work, not adversely affect the temperature and humidity of the building interior; dust and debris shall be controlled to prevent interference with normal operations.
 - 2. Notify the Owner a minimum of three (3) days prior to each required interruption of mechanical or electrical services in the building. Such interruptions shall occur only when, and for the length of time, approved by the Owner.
- D. Building access:
 - 1. Access to the building's interior shall be restricted to investigating leaks and performing portions of the Work which requires such interior access. The Contractor shall not have access to the building's interior during non-business hours unless previously arranged with the Owner.
 - 2. All-access to the project site shall be by way of exterior means provided by the Contractor.
 - 3. Restrict construction traffic over adjacent areas as designated by the Owner during the pre-construction conference.

1.03 MATERIAL STORAGE AND HANDLING

- A. Store materials on-site where specified in Section 01600 - "Materials and Equipment." Do not use any portion of the building interior for storage, unless specifically approved by the Owner.
- B. Stored materials shall be available for review by the Owner or Consultant at all times.
- C. Handle all materials properly and in original cartons or containers to prevent damage. Provide for all necessary rigging of materials and equipment supplied to the project site.

1.04 SANITARY FACILITIES

- A. The Contractor shall provide adequate, temporary chemical toilets for use by his employees. The toilets shall be in place at the project site when the Work is commenced.

- B. Upon completion of the Work, remove these facilities and all traces thereof.

1.05 TEMPORARY WATER

- A. The Contractor shall make arrangements with the Owner for water as required during the performance of the Work.
- B. The Owner shall be responsible for the cost of the water supply.
- C. The Contractor shall be responsible for providing hoses necessary for conveyance.

1.06 TEMPORARY ELECTRICAL POWER

- A. The Contractor shall make arrangements for electrical service, as necessary for the completion of the Work, as established during the pre-construction conference.
- B. In the event that the Owner agrees to provide access to electrical service, he shall pay all energy charges for power and/or lighting used by the Contractor.

1.07 ENVIRONMENTAL CONDITIONS

- A. Do not work in rain or snow, or in the presence of visible precipitation.
- B. Do not install materials marked "Keep from Freezing" when daily temperatures are predicted to fall below 40°F.
- C. Do not perform masonry work unless the temperature is above 35°F and rising. Make provisions to protect masonry work from freezing for a period of forty-eight (48) hours after completion. Remove any masonry work that has been exposed to freezing within forty-eight (48) hours of completion.

1.08 DEBRIS REMOVAL

- A. Remove debris promptly from the roof each day. Do not allow piled debris to accumulate.
- B. All removed material, unless specifically noted for retention by the Owner, becomes the property of the Contractor.
- C. Do not allow debris to enter roof drains, storm sewers, catch basins, etc.
- D. Provide at the site, prior to commencing removal of debris, a dumpster or dump truck to be located adjacent to the building where directed by the Owner.
- E. Protect the building surfaces at set-up and debris removal areas. Take all precautions necessary to prevent the scattering of roofing debris during removal operations.
- F. Remove dumpster or dump truck from the premises when full and dispose of at approved dumping or refuse area.
- G. Upon job completion, dumpster or dump truck and set-up area protection shall be removed from premises. All spilled or scattered debris shall be cleaned up immediately.

1.09 PARKING FACILITIES

- A. The Owner shall provide vehicle parking assignments and/or restrictions for the Contractor to the extent established during the pre-construction conference.

1.10 LEAK (WATER) DAMAGE CONTROL

- A. In the event of rain during the performance of the Work, make roof system watertight and immediately inspect the interior of the building for leaks. The Contractor shall continue to check on the watertight status of the roof system on a 24-hour basis.
- B. Coordinate procedures with the Owner for access to the building during non-business hours for emergency work.
- C. If leaks are discovered during rains. Immediately notify the Owner of the leak condition and perform emergency repairs on the roof system to stop leaks.

1.11 CLEANING

- A. The Contractor shall remove all spillage, overspray, or collections of dust or debris, and repair any damage inflicted on Owner-occupied spaces during the course of the Work.
- B. As soon as work on a roof area is complete, clean up all surfaces, remove equipment, materials, and debris, and restore to a condition suitable for use by the Owner as quickly as possible.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes general requirements for delivery, storage, and handling of products to be used in the Work.

1.02 GENERAL

- A. Materials to be incorporated into the Work:
 - 1. Shall conform to applicable specifications and standards.
 - 2. Shall comply with the size, make, type and quality specified or shall be substitute products as specifically approved, in writing, by the Consultant.
 - 3. Fabricated products:
 - a. Fabricate and assemble in accordance with recognized industry standards.
 - b. Shall conform to the dimensions and configuration shown or specified or in accordance with an approved shop drawing submittals.
- B. Materials shall not be used for purposes other than those for which they are designed unless otherwise specified.

1.03 REUSE OF EXISTING MATERIALS

- A. Except as specifically indicated in the Construction Drawings or in Section 01010 - "Summary of Work," materials and equipment removed from the existing construction shall not be utilized in the completed Work.
- B. Where materials and equipment are specifically indicated to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation, to assure adequate and proper function in the completed Work.
 - 2. The Contractor shall be responsible for transportation, storage, and handling of products that require off-site storage, restoration or renovation.

1.04 MANUFACTURER'S INSTRUCTIONS

- A. Where Project Documents require that the installation of work shall comply with the manufacturer's printed instructions, obtain and distribute copies of those instructions to all parties involved in the installation, including two copies to the Consultant.
 - 1. Maintain one set of complete instructions at the project site until completion of the work.
 - 2. Include copies of the printed instructions with the appropriate Product Data submittal.
- B. Handle, install, connect, clean, condition and adjust products in strict accordance with such instructions, and in conformity with specified requirements.
 - 1. Should existing conditions or specified requirements conflict, in any way, with the manufacturer's instructions, request clarification from the Consultant. Failure to notify the Consultant shall be grounds for rejection of the completed work.
 - 2. Do not proceed with work without clear instructions.

1.05 TRANSPORTATION AND HANDLING

- A. Arrange for delivery of materials in accordance with construction schedules; coordinate to avoid conflict with sequencing of the Work and conditions at the project site.

1. When being transported to the project site by the Contractor, cover and protect materials in transit against the entrance of dirt and/or weather damage.
 2. Deliver materials in undamaged condition, in the manufacturer's original containers or packaging, with identifying labels intact and legible.
 3. Immediately upon delivery, inspect shipments to assure compliance with requirements of the Project Documents and approved submittals, and to assure that materials are properly protected and undamaged.
- B. Handle all materials properly and in original cartons or containers to prevent damage.
- C. Provide equipment and personnel to handle materials using methods necessary to prevent soiling or damage to products or packaging.

1.06 STORAGE OF MATERIALS

- A. Stored materials shall be available for review by the Owner or Consultant at all times.
- B. Store rolled goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged.
- C. Do not use any portion of the building interior for storage, unless specifically approved by the Owner.
1. Disperse materials on the rooftop to avoid concentrated loading of structure.
 2. Do not place materials on newly completed roofing or on areas of roofing not included in the Work.
- D. Stack insulation and roll goods on pallets; neatly stack the wood on dunnage. Do not stack pallets.
- E. Store pallets of the new steel roof deck with one end elevated to provide drainage.
- F. Materials which, in the judgment of the Consultant, have been damaged, contaminated or improperly stored shall be immediately removed from the project site and replaced with new materials.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 01700

CONTRACT CLOSE-OUT AND WARRANTIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section includes requirements for specific administrative procedures, close-out submittals, warranties and other forms to be used at the final completion of the Work.

1.02 CLOSE-OUT PROCEDURES

- A. When the Contractor considers the Work complete, he shall submit **Written Notice** to the Consultant that:
 - 1. He has reviewed the Project Documents and inspected the project for compliance with them;
 - 2. He certifies that the Work has been completed in accordance with the Project Documents; and
 - 3. He certifies that the project is complete, to his satisfaction, and is ready for the Final Review.
- B. The Consultant will perform the Final Review after receipt of the Contractor's **Written Notice** of project completion.
 - 1. If the Consultant considers the Work to be complete and in accordance with the requirements of the Project Documents he shall notify the Contractor to produce the Contract Close-out submittals, as described below.
 - 2. If the Consultant considers the Work to be incomplete or not in accordance with the requirements of Project Documents:
 - a. He shall notify the Contractor, in writing, of the deficiencies.
 - b. The Contractor shall take immediate steps to remedy the identified deficiencies, and shall make the Work ready for re-review.
 - c. The Contractor shall submit a second **Written Notice** to the Consultant confirming that the identified deficiencies have been remedied.
 - d. The Consultant shall review the Work and, if complete, shall notify the Contractor to produce the Contract Close-out Submittals.
 - 3. Should the Consultant be required to perform a third review of the Work due to the failure of the Contractor to correct previously-identified deficiencies, the Owner may retain, from money due the Contractor, such amount as necessary to compensate the Consultant for additional visits.

1.03 FINAL CLEANING

- A. Perform project clean-up prior to the Final Review:
 - 1. Clean roof surface, gutters, downspouts, and drainage system free from foreign matter and debris.
 - 2. Remove all grease, mastics, adhesives, bitumen or other foreign materials from sight-exposed exterior surfaces of the building.
 - 3. Repair, patch and touch up marred surfaces to match adjacent finishes.
 - 4. Remove all waste and surplus material, rubbish, and construction facilities from the project site.
 - 5. Repair the grounds and landscaping in accordance with Section 02900 - "Grounds Repair."
 - 6. Prior to leaving the project site, conduct a thorough review of the roof surface and all sight-exposed exterior surfaces in work areas, to verify that the entire Work is clean.

1.04 CLOSE-OUT SUBMITTALS AND WARRANTIES

- A. Guarantees, Warranties, and Bonds:
1. The Contractor shall, upon project completion provide the following original warranty documents to the Consultant for the delivery to the Owner:
 - a. After the Consultant's acceptance, the Contractor shall deliver to the Consultant each manufacturer warranty required by individual Sections of the Project Specifications, to be effective once complete payment has been received by both the Contractor and material suppliers.
 - b. Contractors two (2) year workmanship warranty for labor and materials.
- B. Certification:
1. Lien Waivers: The Contractor shall submit final Waivers of Lien including those from subcontractors, material suppliers, or any other parties that may have lien rights against the property of the Owner, including a list of those parties. All waivers of lien shall be verified and duly executed before submittal.
- C. Final Application for Payment:
1. The Contractor shall submit a final Application for Payment form showing the remaining amount due.

1.05 CONTRACT CLOSE-OUT PACKAGE

- A. The Contractor shall submit the Contract Close-out package to IRS Corporate Office in accordance with these requirements. The Consultant shall review the Contract Close-out Package for accuracy and completeness.
1. Contract Close-out Packages that are accurate, complete and in proper form shall be approved by Consultant and submitted to Owner on a timely basis.
 2. Contract Close-out Packages that are not accurate, complete and in proper form, Consultant shall notify Contractor of its rejection and cause the Package to be set aside for forty-five (45) days, after which time Consultant shall again review corrected Contract Close-out Package if received and if correct, shall approve final payment and submit them to the Owner on a timely basis.

IRS CORPORATE OFFICE
Attn: kimw@irsroof.com
Industrial Roofing Services, Inc.
13000 West Silver Spring Drive
Butler, Wisconsin 53007

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

SECTION 02900

GROUNDS REPAIR

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This section covers the removal, and replacement with like materials, of lawns, plantings, and pavement damaged by the Contractor during the performance of the Work.
- B. The cost of all repairs covered under this section shall be the sole responsibility of the Contractor. If the Contractor fails to make repairs to the Owner's satisfaction, the Owner reserves the right to retain, from money due the Contractor, such amount as necessary to repair the grounds to their previous condition.

1.02 REQUIREMENTS

- A. Verify, with the Owner, at the pre-construction meeting, as to whether re-seeding will be acceptable for the repair of lawn areas; if not, areas shall be resodded.
- B. All plants and planting materials shall meet "Horticultural Standards" for the number one grade nursery stock as adopted by the American Association of Nurserymen.
- C. All plants and planting materials shall meet or exceed applicable regulatory requirements and inspections for plant disease and insect control.

1.03 WORK SEQUENCING

- A. Do not proceed with permanent replacements until after the Contractor has cleaned and vacated the project site.
- B. Replacement plantings and/or sod:
 - 1. Place plantings and/or sod within forty-eight (48) hours of cutting; protect and maintain during transit and storage on the site to prevent dry-out.
 - 2. All plantings and/or sod remaining unplaced on the site longer than forty-eight (48) hours, as well as any yellowing or otherwise discolored plantings and/or sod, shall be discarded.

1.04 WARRANTY

- A. The Contractor shall maintain and warrant all work performed under this section for a period of ninety (90) days from the date of its completion. The Contractor shall be responsible for the correction of unsatisfactory landscaping materials or workmanship and shall repair such defects promptly upon notice, at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 ACCEPTABLE LAWN REPAIR PRODUCTS

- A. Provide topsoil which is:
 - 1. Natural, friable, and characteristic of soil on the project site;
 - 2. Not extremely acidic nor alkaline, nor containing toxic substances;
 - 3. Free from the subsoil, clay lumps, stones, roots, debris or other foreign objects;
 - 4. Contains 1/3, by volume, soil amendment - organic material, fortified with organic nitrogen.

- B. Provide fertilizer which is:
 - 1. Commercially-balanced 11-8-4 composition.
 - 2. Free-flowing to allow for mechanical spreading.
- C. Provide grass seed, if acceptable, which is:
 - 1. Free from noxious weeds, and recleaned;
 - 2. Grade A recent crop seed;
 - 3. Treated with appropriate fungicide at the time of mixing;
 - 4. In proportion, by weight:
 - a. Kentucky Bluegrass – 35%
 - b. Red Fescue – 20%
 - c. Hard Fescue – 20%
 - d. Improved Fine Perennial Ryegrass – 25%
 - 5. Covered with clean and weed-free straw mulch.
- D. Provide sod, if grass seed is not acceptable, which is:
 - 1. Well established, containing dense root systems;
 - 2. Exhibiting vigorous, healthy root growth;
 - 3. Free of noxious weeds, objectionable grasses, grubs, diseases or injurious insects.

2.02 ACCEPTABLE PLANTING REPAIR PRODUCTS

- A. Provide trees and/or plants which are:
 - 1. Of the same species and size of growth to match those being replaced;
 - 2. Well established, containing dense root systems;
 - 3. Exhibiting vigorous, healthy root growth;
 - 4. Free of grubs, diseases or injurious insects.
- B. Provide planting bed cover consisting of:
 - 1. Ground mulch chips;
 - 2. Shredded bark.

2.03 VEHICLE & PEDESTRIAN PAVEMENTS

- A. Asphalt pavement:
 - 1. Base course aggregate:
 - a. Crushed limestone (traffic-bond) or crushed concrete, containing no pieces over three-quarter (3/4) inch in greatest dimension, for base courses less than four (4) inches thick.
 - b. Crushed limestone, containing no pieces over one and one-half (1-1/2) inches in greatest dimension, for base courses over four (4) inches thick.
 - 2. Paving asphalt:
 - a. Shall comply with applicable sections of the State Highway Specifications for binder and surface-grade paving asphalt mixes.
 - b. Shall be hot, plant-mixed asphalt paving material; temperature shall be 290-320°F when leaving the plant and 280°F, minimum, at time of placement.
- B. Concrete pavement: Compressive strength shall achieve a minimum of 4000 psi in twenty-eight (28) days. Mix concrete materials in accordance with ASTM C94, to comply with the following:
 - 1. Slump: three (3) inches, plus one (1) inch or minus one-half (1/2) inch.
 - 2. Air entrainment: Maximum five percent (5%) at time of placement.
 - 3. Maximum aggregate size: 3/4 inch.
 - 4. Minimum cement content: 440 lbs. /cu. yd.
 - 5. Maximum fly ash content: 100 lbs. /cu. yd.
 - 6. Maximum water-to-cementitious material ratio (W/C): 0.55.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the project site and verify satisfactory conditions for the performance of the work.
- B. Notify the Owner and Consultant of pre-existing defects or conditions which may interfere with the requirements of this section. Absence of notice will constitute the Contractor's acceptance of the site.
- C. Verify the existence and location of underground utilities, water and gas lines, fire sprinkler systems, pavement heating devices, and lawn sprinkling systems.

3.02 PREPARATION

- A. Provide protection of existing adjacent trees, plantings, lawns and pavement prior to commencing repairs.
- B. Lawn replacement areas:
 - 1. Fill ruts and depressions with topsoil. Work the soil to a depth of not less than three (3) inches with a rototiller.
 - 2. Remove stones, debris, and foreign objects larger than one (1) inch in diameter from the lawn repair area prior to seeding or sodding.
 - 3. Grade the repair area, thoroughly remove ridges and depressions, and make the area a smooth, continuous, firm plane that ensures proper drainage.
- C. Planting replacement areas:
 - 1. Remove existing damaged trees, plants or ground cover. Remove large root systems, stones, debris, of foreign objects larger than one (1) inch in diameter from the area prior to the installation of new plantings.
 - 2. Remove the topsoil, to a depth of not less than three (3) inches, from an area not less than three (3) times the width of the root ball of the new planting.
 - 3. Dig a hole in the center of the prepared area:
 - a. For a one (1) gallon plant container, twelve (12) inches wide and deep.
 - b. For a five (5) gallon plant container, twenty (20) inches wide and deep.
 - c. For a fifteen (15) gallon plant container, thirty (30) inches wide and deep.
 - d. For larger trees, 1-1/2 times the root ball diameter wide and deep.

3.03 LAWN REPLACEMENT - SEEDING

- A. When preparations are complete, seed the repair area:
 - 1. Sow the grass seed over the area with a mechanical seeder at the rate of five (5) pounds per thousand (1,000) square feet.
 - 2. Promptly after seeding, water until the soil is saturated to a depth of two (2) inches; apply water slowly to prevent erosion of the seedbed.
 - 3. Apply the specified fertilizer at the rate of twenty (20) pounds per thousand (1,000) square feet; rake lightly into the soil.
 - 4. Cover the repair area with chopped straw mulch approximately 1/2-inch thick.
 - 5. Make arrangements to keep the seedbeds moist throughout the germination process.

3.04 LAWN REPLACEMENT - SODDING

- A. When preparations are complete, install sod:
 - 1. Fit sod pieces tightly together so that no joint is visible, with alternate courses staggered. Compact sod to eliminate all air pockets, provide a true and even surface, and ensure knitting without displacement of sod or deformation of the surface of sodded areas.
 - 2. Fill cracks between sod pieces with screened topsoil following compaction.
 - 3. Excess soil shall be worked into the grass surface.

4. Bury edges of sod pieces flush with adjacent soil.
5. After the sod has been placed, water with a fine spray until the soil is saturated to a depth of two (2) inches.
6. Make arrangements to keep the sod moist until it is rooted in place.

3.05 TREE, PLANT AND GROUND COVER REPLACEMENT

- A. When preparations are complete, install planting:
1. Fill the bottom of the hole with a backfill mixture, consisting of three (3) parts soil (removed from the hole) and one (1) part soil amendment, to support the root ball so that the top of the ball is just above or equal to the existing grade for drainage.
 2. Place the root ball of the planting into the hole and adjust for the height and position of the planting. Work excess soil to the sides for support of the root ball.
 3. Fill the remaining area of the hole with backfill mixture around the root ball; tamp firmly to eliminate all air pockets. When the hole is 2/3 full, thoroughly water the plant to saturate the soil.
 4. Fill the remainder of the area with topsoil and tamp into place until the surface is slightly sloping to the edge of the surrounding area.
 5. Remove excess soil from the area.
 6. Stake trees over four (4) feet high with a minimum of two (2) stakes and ties. Drive stakes a minimum of twelve (12) inches deep; provide protection for the trunk at tree-tie location.
 7. Apply the specified planting bed cover to a minimum depth of two (2) inches, evenly spread over the entire area.
 8. Water with a fine spray to ensure that the soil is thoroughly saturated.
 9. Make arrangements to water the planting regularly until it is rooted in place.

3.06 PAVEMENT REPLACEMENT

- A. Removal and subgrade preparation:
1. Remove damaged areas of paving, as well as areas of unsound pavement and areas heavily stained with grease and oil.
 2. Cut edges to a straight, vertical edge of 1/2-inch or more, by means of mechanical sawing. Excavate a minimum of six (6) inches below the existing, surrounding pavement surface, or as necessary to reach sound base material.
 3. Provide new aggregate subbase as required to fill within three (3) inches of existing, surrounding asphalt pavement surface or to within four (4) or six (6) inches of existing, surrounding concrete pavement surface, depending on slab thickness. Compact aggregate subbase to 95% density.
- B. Asphalt paving replacement:
1. Place the new asphalt paving material in two lifts:
 - a. The first lift shall be 1-3/4 inches, after compaction, binder-grade asphalt.
 - b. The second lift shall be 1-1/4 inches, after compaction, surface-grade asphalt.
 2. Spread material in a manner that requires minimal handling.
 3. After the material is placed, to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the specified thickness and elevation of the existing, surrounding asphalt pavement.
 4. Roll surface layer in at least two directions until no roller marks are visible.
 5. The finish paving surface shall be free from "birdbaths," with no variations of more than 1/8-inch in six (6) feet.
 6. Seal the interface of the existing pavement with hot rubberized crack filler to prevent water infiltration.

- C. Concrete paving replacement:
1. Place wooden forms where necessary, staked into the ground, to provide straight and true edges for new pavement.
 2. Dampen the subgrade material before placing concrete.
 3. Pour concrete over the prepared subgrade. Tamp the freshly-placed concrete, using a heavy tamper, until at least 3/8-inch of mortar is brought to the surface.
 4. Trowel surface and screed with a straightedge until depressions and irregularities are worked out and the surface is true to specified thickness and elevation of the existing, surrounding concrete pavement.
 5. Float surface to a compact, smooth surface.
 6. When the concrete has set sufficiently, provide a non-slip, "broomed" surface finish.

END OF SECTION

SECTION 06100

ROUGH CARPENTRY

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Rough carpentry includes carpentry work not specified as part of other sections and which is generally not exposed to normal view (concealed).
 - 2. Wood grounds, nailers, blocking and sleepers.
 - 3. Fasteners and connectors required for the work.

1.03 QUALITY ASSURANCE

- A. Standards:
 - 1. Lumber: Comply with PS 20, WWPA Grading Rules and other grading rules as specified.
 - 2. Plywood: Comply with PS 1, "U.S. Product Standard for Construction and Industrial Plywood".
 - 3. Factory-mark each piece of lumber and plywood with type, grade, mill, and grading agency, except omit markings from surfaces to be exposed with transparent finish or without finish.

PART 2 - PRODUCTS

2.01 DIMENSIONAL LUMBER

- A. Wood blocking, two to four (2-4) inches in nominal thickness:
 - 1. Blocking shall be kiln-dried Southern Pine, Douglas Fir; Structural Grade #2 or better, complying with lumber producer's inspection agency grading rules certified as conforming to the "National Grading Rule For Dimension Lumber", by the Board of Review of the American Lumber Standards Committee (ALSC), established under Section 10 of PS-20.
 - 2. Dimensional lumber shall be smooth four sides (S4S) unless otherwise shown or indicated.
 - 3. Dimensional lumber shall be seasoned, with nineteen percent (19%) maximum moisture content at the time of dressing, complying with the dry size requirements of PS-20. Lumber shall be marked "S-Dry".
 - 4. Dimensional lumber shall be:
 - a. Nailers: nominal size as indicated on the Construction Drawings.
 - b. Blocking: nominal size as indicated on the Construction Drawings.

2.02 PLYWOOD

- A. Minimum thickness: 1/2-inch, 4-ply.
- B. Interior grade C-D or better, with exterior glue (CDX), conforming to the rating of the American Plywood Association (APA), PS 1-83.

2.03 FASTENERS

- A. Dimensional Lumber to Dimensional Lumber: (Horizontal Nailer)
 - 1. All-Purpose Fastener by Firestone Building Products Company, Indianapolis, IN.
 - 2. Head: # 3 Phillips drive
 - 3. Length: 2-7/8 inches
 - 4. Coating: Red epoxy applied by Electroplating
 - 5. Dimensional lumber sections shall be fastened together through their widest face dimension with two (2), rows of fasteners spaced 24-inches on center, staggered.
 - 6. Fastener rows shall be placed a minimum of 1-inch from the narrowest face dimension of the lumber sections.
- B. Dimensional Lumber / Plywood to concrete or masonry:
 - 1. Tapcon Phillips-head anchor, (by Buildex Division of ITW, Inc., Itasca, IL).
 - a. 3/16-inch minimum diameter and 1-1/4 inch minimum embedment.
 - 2. Nailers of dimensional lumber/plywood shall be fastened through the center of their widest face to the substrate as follows:
 - a. 2" x 6" – one (1) row of fasteners spaced 24-inches on center
 - b. 2" x 8" – one (1) row of fasteners spaced 24-inches on center
 - 3. Fasteners shall not be placed closer than 3-inches from the edge of concrete.

PART 3 - EXECUTION

3.01 CARPENTRY INSTALLATION

- A. General requirements:
 - 1. Do not use lumber or materials which are unsound, warped, bowed, twisted, inadequately seasoned, or too small to fabricate the work with a minimum of joints.
 - 2. Fit carpentry work to other work. Produce joints which are tight, true and well fastened.
 - 3. Set carpentry accurately to required levels and lines with members plumb and true.
 - 4. Attach carpentry to substrates with specified fasteners in accordance with fastener manufacturers printed instructions.
 - a. Countersink new fastener heads flush with the top of wood members. Hollow out bottom of new wood members, if necessary, to fit over existing exposed bolt heads that are not countersunk.
 - b. Countersink nail heads on exposed carpentry and fill holes.
 - 5. Select fastener size that will not penetrate members where the opposite side will be exposed to view or will receive finish materials.
 - 6. Threaded fasteners shall be turned into place, not driven.
 - 7. Fasteners shall be tightened at installation and retightened as required prior to closing in or at the completion of work.
- B. Examine existing nailers and blocking which conforms to the Construction Drawings at walls, edges, expansion joints, hatches, pipes or curbs:
 - 1. Replace deteriorated sections with new dimensional lumber of the same size.
 - 2. Enhance existing fastening to comply with fastening requirements outlined herein and/or as indicated on the Construction Drawings.
- C. Install new wood nailers and blocking to achieve thicknesses and elevations required by the Construction Drawings:
 - 1. Fasten carpentry in accordance with fastening requirements outlined herein and/or as indicated on the Construction Drawings.
 - 2. Install addition fasteners, as required to counteract minor warpage or variances in the substrate, and to hold tight and true to lines.
 - 3. When using multiple courses of carpentry, weave corners and stagger end joints a minimum of two (2) feet from the underlying course.

3.02 CLEANING

- A. Wood chips, shavings, sawdust, and other debris shall be swept up and removed from the work area daily prior to installation of subsequent roofing components.
- B. During the progress of the Work, use all means necessary to prevent the spread of dirt and debris to the building interior.
- C. Clean building interior on a daily basis, and when deck replacement is completed.

END OF SECTION

SECTION 07531

ADHERED ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Adhered EPDM membrane roofing system.
 - 2. Roof insulation, flat and tapered.
 - 3. Flashings.

1.03 REFERENCES

- A. American Society of Civil Engineers (ASCE) – ASCE 7 – Minimum Loads for Buildings and Other Structures, Current Revision.
- B. ANSI/SPRI WD-1 “Wind Design Standard for Roofing Assemblies”.
- C. ASTM International (ASTM):
 - 1. ASTM C 208 - Standard Specification for Cellulosic Fiber Insulating Board.
 - 2. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - 3. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 4. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - 5. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - 6. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - 7. ASTM D 816 - Standard Test Methods for Rubber Cements
 - 8. ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - 9. ASTM D 4637 - Standard Specification for EPDM Sheet Used In Single-Ply Roof Membrane.
 - 10. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- D. International Code Council (ICC):
 - 1. International Building Code (IBC).
- E. National Roofing Contractors Association (NRCA) - Low Slope Roofing and Waterproofing Manual, Current Edition.
- F. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- G. Underwriters Laboratories (UL):
 - 1. TGFU R1306 - "Roofing Systems and Materials Guide".
 - 2. UL-790 - Standard Test Method for Fire Tests of Roof Coverings.

1.04 DEFINITIONS

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

1.05 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.

1.06 SUBMITTALS

- A. Product Data: For each type of product indicated including sheet membrane, elastic flashing, joint cover sheet, and joint and temperature range for application of membrane insulation, surfacing, and fasteners.
- B. Qualification Data: For qualified Installer and manufacturer.
- C. Manufacturer Certificate: Signed by roofing manufacturer certifying that the membrane roofing system complies with requirements specified in Section 01700 "Contract Closeout and Warranties".
- D. Submit evidence of complying with performance requirements.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by the manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- F. Maintenance Data: For membrane roofing system to include in maintenance manuals.
- G. Manufacturer's Instructions: Inspection, preparation and installation instructions.
- H. Warranties: Sample of warranty(s).

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
 - 1. Company specializing in manufacturing the products specified in this section with a minimum ten (10) years documented experience.
- B. Installer Qualifications:
 - 1. The installer shall be a firm that is approved, authorized, or licensed by the specified membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's warranty. The installer shall be the firm submitting the bid form.
 - 2. The company shall be a firm that specializes in performing the work of this section with a minimum of ten (10) years' experience performing this work.

3. The installer shall submit a copy of certification confirming the bidder's standing as a licensed applicator for the specified manufacturer and their eligibility to receive the specified warranty.
- C. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's printed instructions.
 1. Maintain one (1) copy on site.
- D. Source Limitations: Obtain all primary components including roof insulation, adhesives, fasteners, etc... for membrane roofing system from the same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- E. Exterior Fire-Test Exposure: ASTM E 108, Class A for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

1.08 DELIVERY, STORAGE, AND HANDLING

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

1.09 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit the roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Coordination: Coordinate the work with the installation of associated counter flashings installed by other sections as the work of this section proceeds.

1.10 FIELD CONDITIONS

- A. Field verify locations and dimensions of items critical to the design, fit or assembly of the work of this section. Complete field dimension prior to the fabrication of components. Verify field measurements are as indicated in shop drawings.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which the manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, and other components of the membrane roofing system, including workmanship of installation.

2. Warranty Period: **Ten (10) years** from the date of Substantial Completion.
- B. Special Project Warranty: Submit roofing installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
 1. Warranty Period: **Two (2) Years** from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.
 1. Acceptable manufacturers:
 - a. Firestone Building Products
 - b. Carlisle SynTec Incorporated.
 - c. Versico Roofing Systems
 2. Thickness: 60 mils nominal.
 3. Type: Low Slope Fire Retardant
 4. Exposed Face Color: Black.

2.02 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for the intended use and compatible with membrane roofing.
 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction or building owner's preference.
 2. Adhesives and sealants that are not on the exterior side of the weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesive: 80 g/L.
 - f. Single-Ply Roof Membrane Sealants: 450 g/L.
 - g. Nonmembrane Roof Sealants: 300 g/L.
 - h. Sealant Primers for Nonporous Substrates: 250 g/L.
 - i. Sealant Primers for Porous Substrates: 775 g/L.
 - j. Other Adhesives and Sealants: 250 g/L.
- B. Sheet Flashing: 60-mil thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard, solvent or water-based as required by Owner.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer, and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately one (1) by 1/8 inch (25 by 3 mm) thick; with anchors.

- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone, and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, "T-joint" covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.03 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for the application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2:
1. Field of roof:
 - a. 1.5" thick flat stock (4'x4' boards)
 2. Tapered saddle at drains
 - a. Sloped at 1/2" per lineal foot, with a 1/2" starting thickness
 - b. Provide 0"-1/2" tapered fiberboard edge strip at the leading edge.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where required for sloping to drain. Fabricate saddles and crickets to the slope of 1/2 inch per 12 inches unless otherwise indicated; Fabricate tapered edge strips and other insulation shapes as indicated on Construction Drawings.

2.04 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Bead-applied Insulation Adhesive: Insulation manufacturers recommended bead-applied, low-rise, one or multi-component urethane adhesive formulated to attach roof insulation to the roof deck.
1. Summer grade or winter-grade, as needed depending on weather conditions
 2. Prime existing deck prior to use if required by the manufacturer

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting the performance of roofing system:
1. Verify that roof opening and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to the roof deck at penetrations and terminations and those nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. The clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast.

Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with the membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install insulation under the area of roofing to achieve the required thickness.
 - 1. Install insulation with end joints staggered between rows.
 - 2. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- D. Adhered Insulation: Install insulation using adhesive specifically designed for adhering specified board-type roof insulation to the roof deck.
 - 1. **Maximum bead spacing: 4-inches on center**
 - 2. Place temporary weighting atop the placed insulation until the adhesive sets.
- E. The trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

3.04 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Place membrane without stretching over the acceptable substrate, and allow to relax a minimum of 30 minutes before bonding.
- B. Start the installation of membrane roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing, without stretching, and maintain uniform side and end laps of minimum dimensions required by the manufacturer. Stagger end laps.
- D. After making sure the sheet is placed in its final position, fold it back evenly onto itself so as to expose the underside. (Note: The sheet fold should lay smooth so as to minimize the formation of wrinkles during and after installation.)
- E. Sweep the mating surface of the membrane with a stiff broom to remove excess dusting agent (if any) or other contaminants from the mating surface.
- F. Apply bonding adhesive at about the same time to both the exposed underside of the sheet and the substrate to which it will adhere so as to allow approximately the same drying time. Apply bonding adhesive evenly so as to avoid globs.
- G. Apply bonding adhesive and roll the adhesive on to the mating surfaces or spray-on bonding adhesive and then roll out with a solvent resistant paint roller.
- H. Care must be taken not to apply bonding adhesive over an area that is to be later cleaned and spliced to another sheet or flashing.
- I. Apply bonding adhesive in accordance with the manufacturer's specifications. The coverage rate will differ with variance of substrates and climatic conditions.
- J. Allow bonding adhesive to flash off until tacky. Touch the bonding adhesive surface with a clean, dry finger to be certain that the adhesive does not stick or string. As you are touching the adhesive, pushing straight down to check for stringing, also push forward on the adhesive at an angle to ensure that the adhesive is ready throughout its thickness. If either motion exposes wet or stringy adhesive when the finger is lifted, then it is not ready for mating. Flash off times will

vary depending on ambient air conditions.

- K. Starting at the fold, roll the previously coated portion of the sheet into the coated substrate slowly and evenly so as to minimize wrinkles.
- L. To ensure proper contact, compress the bonded half of the sheet to the substrate with a stiff push broom.
- M. Fold the unadhered half of the membrane sheet back onto itself, and repeat the bonding procedure to complete the bonding of the sheet.
- N. Apply membrane roofing with side laps shingled with the slope of deck where possible.
- O. Seam Installation (Tape): Clean both faces of splice areas, apply splice primer as required, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation.
- P. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- Q. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.05 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at the required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Terminate and seal the top of sheet flashings and mechanically anchor to substrate through termination bars.

3.06 FIELD QUALITY CONTROL

- A. Testing: The owner may engage a qualified independent testing agency to perform inspections.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of the membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at the Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.07 PROTECTION AND CLEANING

- A. Protect the membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Consultant and Owner.

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

3.08 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS <Insert name> of <Insert address>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: <Insert name of Owner.>
 - 2. Address: <Insert address.>
 - 3. Building Name/Type: <Insert information.>
 - 4. Address: <Insert address.>
 - 5. Area of Work: <Insert information.>
 - 6. Acceptance Date: <Insert date.>
 - 7. Warranty Period: Two (2) Years.
 - 8. Expiration Date: <Insert date.>
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. Lightning;
 - b. Peak gust wind speed exceeding 55 mph;
 - c. Fire;
 - d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. Vapor condensation on the bottom of roofing; and
 - g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 - 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 - 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to the building or building contents resulting from leaks or faults or defects of work.
 - 4. During the Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing

Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. The owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for the performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <Insert day> day of <Insert month>, <Insert year>.

1. Authorized Signature: <Insert signature>
2. Printed Name: <Insert name>
3. Title:
4. Date of Signature

END OF SECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. Section Includes:
 - 1. Formed roof flashing and trim.

1.03 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Water Infiltration: Provide sheet metal flashing and trim that does not allow water infiltration to building interior.

1.04 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.06 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation.
- B. Where sheet metal flashings are incorporated into other building systems, installation shall commence concurrently with the installation of such building components to prevent delays.
- C. Where sheet metal flashings are designed to provide counter flashing, installation shall commence after the installation of other building components has been completed in accordance with the specifications.

1.07 SEQUENCING AND SCHEDULING

- A. The owner will occupy portions of the building immediately adjacent to work area. Conduct activities so Owner's operations will not be disrupted. Provide not less than 48 hours' notice to Owner of activities that will affect Owner's operations.

PART 2 – PRODUCTS

2.01 SHEET METALS

- A. Prefinished galvanized: AISA-G90 Extra Smooth, minimum spangle, tension leveled, hot-dipped galvanized steel conforming to ASTM A653:
 - 1. Finish shall consist of primer on both sides, minimum 0.25-mil thickness, followed by a 70% Kynar 500® resin premium fluoropolymer (PVDF) coating on one side to achieve a 1.0 mil (+/- 0.1-mil) dry-film thickness.
 - a. The manufacturer's standard color will be selected by the Owner.
- B. Galvanized steel sheet: AISA-G90 Extra Smooth, minimum spangle, tension leveled, and hot-dipped galvanized steel conforming to ASTM A653.
- C. Termination bar:
 - 1. Extruded aluminum compression bar, 0.100-inch minimum thickness and 1-1/4 inch width, with caulking cup.

2.02 UNDERLAYMENT MATERIALS/CONCEALED FLASHING

- A. ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet

2.03 FASTENERS

- A. Unless specified otherwise in the Construction Drawings or elsewhere in the project specifications, sheet metal fasteners shall comply with this section.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads:
 - 1. Exposed Screw Fasteners: Heads matching the color of sheet metal by means of plastic caps or factory-applied coating. Use only where concealed fasteners cannot be used.
 - a. Sheet Metal to Sheet Metal: Self Drilling, self-tapping, gasketed #10 Hex Washer Head sheet metal screw. Length as required for application, but no less than three (3) threads pitch into metal.
 - b. Sheet Metal to Wood: Gasketed Hex Washer Head wood screw. Size and length as required for application but no less than #10 size and 1 inch in length.
 - c. Sheet Metal to masonry: Corrosion-resistant pre-drilled gasketed masonry screws with hex washer head, minimum 3/16" thickness; length to provide embedment as required by fastener manufacturer.
 - 2. Concealed Screw Fasteners:
 - a. Sheet Metal to Sheet Metal: #10 Self Drilling, self-tapping, Phillips Pan Head sheet metal screw. Length as required for application, but no less than three (3) threads pitch into metal.
 - b. Sheet Metal to Wood: #10 Phillips Pan Head Wood Screw. Size and length as required for application, but no less than #10 size and 1 inch in length.
 - c. Sheet Metal to masonry: Corrosion-resistant pre-drilled masonry screws with hex washer head, minimum 3/16" thickness; length to provide embedment as required by fastener manufacturer.
 - 3. Nails: for use where roof edge flashing, cleats, and other flashings are fastened to the wood substrate and whose nailing flanges are covered by roof materials or finish metal.

- a. Standard round wire; minimum twelve (12) gauge shank, smooth, barbed or deformed shank, with heads 3/8 inch (9mm) in diameter.
 - b. Length: 1.25-inches
- C. General fastener requirements (unless otherwise noted):
 - 1. Fastener types for given metal types:
 - a. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 - b. Aluminum: Use aluminum or stainless-steel fasteners.
 - c. Stainless Steel: Use stainless-steel fasteners.
- D. Blind Fasteners: High-strength aluminum, galvanized or stainless-steel rivets.

2.04 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Elastomeric Sealant
 - 1. Polyurethane, ASTM C 920, Grade NS, Class 25, Type S.

2.05 FABRICATION, GENERAL

- A. General:
 - 1. Custom fabricated sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
 - 2. All finish flashings, where applicable, must be fully engaged and continuously crimped onto the underlying cleat.
 - 3. All points where the sheet metal flashing ends or transitions into a different flashing detail shall be flashed with a field-formed sheet metal closure. The use of mastic or excessive caulking shall not be acceptable.
- B. 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.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- D. Sealed Joints: Form nonexpanding but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- F. Fabricate cleats and attachment devices from the same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: Unless specified otherwise, as recommended by SMACNA's "Architectural Sheet Metal Manual" but not less than the thickness of metal being secured.

2.06 ROOF SHEET METAL FABRICATIONS

- A. Cleats:
 - 1. Fabricate in minimum 96-inch (2400-mm) long, but not exceeding 10-foot (3-m) long, sections.
 - 2. Dimensions:
 - a. Fabricate to the profile shown in the Construction Drawings.

3. Fabricate from the following material:
 - a. Galvanized: 22 gauge; 0.0309 (0.784 mm) thick
 4. Joint Style:
 - a. Butt, with 1/2" gap between sections.
- B. Metal Edge Flashing (low-slope roof drip edge):
1. Fabricate in minimum ninety-six (96) inch (2400-mm) long, but not exceeding ten (10) foot (3-m) long, sections.
 2. Dimensions:
 - a. Fabricate to the profile shown in the Construction Drawings.
 - b. External vertical leg: shall be hemmed and extend 1.5-inches minimum down over the top edge of fascia below.
 - c. Horizontal nailing flange: four (4) inch minimum length
 3. Fabricate from the following material:
 - a. Prefinished Galvanized: twenty-four (24) gauge; 0.0239 inch (0.607 mm) thick
 4. Joint Style:
 - a. Lap two (2) inches (50-mm).
 - 1) At lap, notch the bottom hem of one section two (2) inches to accommodate the adjacent section.
 - 2) Apply a continuous bead of sealant between lapped sections.
 - 3) Hook the overlying sheet metal flashing onto the adjacent sheet metal flashing section; creating a two (2) inch minimum lap.
 - 4) Lap shall be oriented in the same direction of water run-off.
- C. Counter flashing:
1. Fabricate in minimum ninety-six (96) inch (2400-mm) long, but not exceeding 10-foot (3-m) long, sections.
 2. Fabricate to profile shown in the Construction Drawings
 - a. Ensure counter flashing extends four (4) inches minimum down over flashings/components below.
 - b. Over bend to ensure flashings sits tightly against flashings below.
 3. Fabricate from the following material:
 - a. Prefinished Galvanized: twenty-four (24) gauge; 0.0239 inch (0.607 mm) thick
 4. Joint Style:
 - a. Lapped joints:
 - 1) Lap sheet metal sections two (2) inches, minimum.
 - 2) At lap, notch the bottom hem of one section two (2) inches to accommodate the adjacent section.
 - 3) Apply a continuous bead of sealant between lapped sections.
 - 4) Hook the overlying sheet metal flashing onto the adjacent sheet metal flashing section; creating a two (2) inch minimum lap.
- D. Fascia Cladding:
1. Fabricate in minimum ninety-six (96) inch (2400-mm) long, but not exceeding ten (10) foot (3-m) long, sections.
 2. Dimensions
 - a. Fabricate to the profile shown in the Construction Drawings.
 - b. When fascia cladding extends down over exterior finish/siding, provide hemmed leg which overlaps exterior finish/siding 1.5-inches minimum.
 3. Fabricate from the following material:
 - a. Prefinished Galvanized: twenty-four (24) gauge; 0.0239 inch (0.607 mm) thick
 4. Joint Style:
 - a. Lap sheet metal sections two (2) inches, minimum.
 - b. At lap, notch the bottom hem of one section two (2) inches back from the end, to accommodate the adjacent section.
 - c. Apply a continuous bead of sealant between lapped sections.
 - d. Hook the overlying sheet metal flashing onto the adjacent sheet metal flashing section; creating a two (2) inch minimum lap.

2.07 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. The appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, to verify actual locations, dimensions and other conditions affecting the performance of work:
 - 1. Verify that the substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 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, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system:
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- C. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- D. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify the shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- E. Seal joints with elastomeric sealant as required for watertight construction.
 - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch (25 mm) into the sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 ° and 70 ° F (4° and 21 ° C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40° F (4° C).
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."

3.03 FABRICATED ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as

indicated. Install work with laps, joints, and seams that will be permanently watertight.

- B. Cleats:
 - 1. Install sections in straight lines and fasten to the substrate:
 - a. When cleat is fabricated with one nailing flange, fasten with two (2) rows 6-inches on center, staggered, with roofing nails.
- C. Metal Edge Flashing (low-slope roof drip edge):
 - 1. Set sections in the continuous bead of water cut-off mastic on roof membrane.
 - 2. Fasten nailing flange with two (2) rows of roofing nails 6-inches on center; staggered.
- D. Counter Flashing: Coordinate the installation of counter flashing with the installation of flashing below.
 - 1. Surface Mounted:
 - a. Fasten to the wall at twelve (12) inches on center with color-matched gasketed screws.
 - b. Waterproof with tooled sealant along with caulking cup.
- E. Fascia Cladding
 - 1. Coordinate installation with the installation of other roofing materials.
 - 2. Interlock bottom edge with continuous cleat, where applicable. Ensure the bottom hem is fully crimped onto bottom edge of cleat.
 - 3. Fasten top edge at twenty-four (24) inches on center with roofing nails.
- F. Termination bar:
 - 1. Mechanically fasten twelve (12) inches on center maximum.
 - 2. Leave 1/8-inch space between termination bar sections.

3.04 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 and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of the installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain a clean condition during construction.
- D. 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.
- E. Repair of deficiencies:
 - 1. Installation or details noted as deficient during Final Review must be repaired and corrected by Contractor, and made ready for review, within five (5) working days.

END OF SECTION