PART 1   GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Flashing & Trim:  Section 076000.

B. Joint Sealer:  Section 079200.

C. Rough Carpentry:  Section 061000

1.02 DEFINITIONS

A. Company Field Advisor:  An employee of the Company which lists and markets the primary components of the system under their name who is certified in writing by the Company to be technically qualified in design, installation, and servicing of the required products or an employee of an organization certified by the foregoing Company to be technically qualified in design, installation, and servicing of the required products.

B. Concentrated Loads:  Positive downward acting, localized loads.

C. Uniform Design Loads:  Positive downward acting loads and negative upward acting loads specified in this section, including wind uplift and snow loads.

D. Test Loads:  The ultimate uniform test load at which each element of the standing seam roof system fails.

E. Allowable loads:  The ultimate tested load on each element of the roof system divided by the appropriate safety factor for the failure mode being evaluated. Allowable loads may be increased by 1/3 for wind loading only.

   1. For yielding type failure modes such as panel buckling, use a factor of safety of 2.0.
   2. For connection related failure modes such as fastener withdrawal, clip failure, panel disengagement from clip and seam failure, use a factor of safety of 2.5.

   a. For fastener withdrawal use a leverage factor of 2 in addition to a safety factor of 2.5.

F. Hydrostatic Joinery:  Watertight joints that can withstand a static head of water without leaking. Flashings shall contain hydrostatic joinery, with no joint dependant on exterior sealants for water tightness at panel to panel, flashing to flashing or flashing to panel transitions.
1.03 SYSTEMS DESCRIPTION

A. SALT STORAGE: Preformed Metal Roofing System: Structural standing Seam roof panels with concealed clips and spreader plates installed over vapor retarder and 5/8” pressure treated wood deck. The system includes all related metal flashings and concealed flashings.

B. YEAGER GARAGE: Preformed Metal Roofing System: Structural low profile seam roof panels with concealed clips and spreader plates installed over 2” rigid insulation, vapor retarder and 5/8” pressure treated wood deck. The system includes all related metal flashings and concealed flashings.

1.04 PERFORMANCE REQUIREMENTS

A. UL Wind Uplift Rating: Minimum UL class 90 rated roofing systems tested in accordance with UL 580 test method.

B. Standard Test Method for Water Penetration: ASTM E2140-01 Standard Test Method for Water Penetration of Metal Roof Panel System by static water pressure head. (Hydrostatic Roof System Test)

C. Concentrated Roof Loads: The panels shall withstand a 250 pound concentrated load applied to a four square inch area located at the center of the panel and at the center of the maximum span without any sign of permanent panel deformation, rib buckling, or panel side lap separation.

D. Uniform Roof Design Loads:
   1. The roofing system shall safely resist the positive and negative loads specified below, plus the appropriate safety factors, when tested in accordance with the principles of ASTM E 1592-01. Installed roof system shall withstand negative wind uplift pressures complying with the following criteria:
      a. The Component and Cladding Chart shown on Drawing A-102 & A-103 of the Contract Documents or Design Code: ASCE-7, Method 2 for Components and Cladding
      b. Safety Factor: 2.5 after any load reduction or material stress increase
      c. Building Category: II with an importance factor of 1.15
      d. Wind Speed: 90 mph
      e. Exposure Category: C
      f. SALT STORAGE: Mean Roof Height: See Drawing A-104 and building elevations as noted:
      h. Roof Pitches: SALT STORAGE (VARIES) and YEAGER GARAGE (3 on 12).
2. Add appropriate drifting snow factor to positive (+) snow loads specified, in accordance with ASCE 7-02.

3. The width of the high pressure zones 2 and 3 (corners, rakes, eaves, ridges and hips) that may require additional clips to resist the negative (-) loads specified shall be as shown on the Component and Cladding Chart on Drawing A-101 of the Contract Documents.

E. Test Performance Criteria For Uniform Roof Design Loads:
1. The roof system when tested in accordance with the specified test methods, must meet the following conditions:
   a. The ultimate test loads must be sustained for at least one minute.
   b. There are no signs of permanent panel deformation, rib buckling, sidelap separation, tearing, cracking, rupture, clip disengagement, or other evidence of permanent distortion.
   c. Fasteners shall remain secure and maintain the securement of the connected components and show no sign of deformation or loosening.
   d. Deflection Limitations: Maximum L/140 for negative uniform loads and maximum L/180 for positive uniform loads.
2. Design capacity for conditions of gauge, span or loading other than those tested may be determined by the interpolation of test results in accordance with the AISI Cold Formed Steel Manual. Extrapolation outside the range of the tests is not acceptable.

F. Air Infiltration: No more than 0.0036 CFM at 20 PSF when tested in accordance with ASTM E 1680-95.

G. Water Penetration: None, when tested at 20 PSF for 15 minutes in accordance with ASTM E 1646-95.

H. Thermal Expansion: The system including all flashings, shall allow for expansion and contraction within a minimum ambient temperature range of 200 degrees F.

I. Metal panel assembly shall be listed with Underwriter’s Laboratories as a Class “A” roof system with regards to their resistance to external flame sources.

J. Metal panels shall be listed with Underwriter’s Laboratories as Class 4 Hail resistant panels.

1.05 SUBMITTALS

A. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 01330 does not apply to this Section.

B. Submittals: Submit product data, samples, all the items listed under Quality Control Submittals, and any proposed deviations from the Contract Documents, at the same time as one complete package. Partial submittals will not be considered.
1. Proposed Deviations From The Contract Documents: To be considered for approval, proposed deviations must be submitted with the initial submittal package. Proposed deviations submitted after the initial submittals package is approved will not be considered or approved and may be cause for rejection of the previously approved manufacturer or system.

2. Product Data: Catalog sheets, specifications, load tables, and installation instructions for each material specified.
   a. Contract Documents: Unless approved otherwise, the Contract Documents have precedence over manufacturer’s details and specifications except when a specific detail or condition is not addressed in the Contract Documents.
   b. Manufacturer’s Details: Do not use or submit manufacturer’s details unless there is an omission or proposed deviation from the Contract Documents. In such instances, submit the proposed detail for approval. The proposed detail shall be referenced directly to the related detail on the Contract Drawings.
   c. Manufacturer’s Specifications: When there is a proposed deviation from the Specifications of the Contract Documents, submit the proposed deviation for approval. The proposed deviation shall be referenced directly to the related article in the Contract Specifications.
   d. Manufacturer’s Warranty: Sample copy of the metal roof system manufacturer’s single source 20 year no leak warranty and 20 year finish warranty, covering workmanship and materials.

C. Samples:
   1. Roof Panel: Full panel width, 12 inches long.
   2. Warranty: Copy of printed warranty.
   3. Color Samples: Panel manufacturer’s standard range of colors for finish specified.

D. Shop Drawings: Show fabrication and installation details and methods of joining and fastening panels, fastener spacing, flashings and other accessories in accordance with the Contract Documents and approved deviations (if any). Shop drawings shall be prepared by the metal roof manufacturer. All shop drawings to be stamped and sealed by an engineer employed by the metal roof manufacturer and shall be registered in the state of New York.
   a. Show the location and spacing of the concealed clips and bearing plates as required to resist the uniform roof design loads.
   b. Show the location and spacing required at main roof, eaves, rakes, roof ends and corners.
   c. Concealed clips and bearing plates spacing not to exceed 4’-0” on center maximum.

E. Quality Control Submittals:
   1. Test Reports:
      a. UL Wind Uplift Rating: Statement certifying that the roof system has been tested in conjunction with the type of structural
roof deck and roof slope applicable to the project and has achieved a UL 90 Wind Uplift rating. Acceptable certification:
Letter from UL or a copy of the UL classification listing for the roofing system.

b. Test Report of ASTM E 1592-01: Test report written and signed by a professional engineer from a recognized independent test laboratory listing the complete documentation and test results. Include a letter certifying that the roof system as tested, meets or exceeds the specified uniform design loads.

c. Air and Water Infiltration Tests: Statement certifying that the roof system has been tested in accordance with the specified test procedure and that the specified minimum requirements have been achieved.

2. Summary Report: In addition to the test reports specified above, submit a separate Summary Report as follows:
   a. Failure Mode(s) and Ultimate Test Load(s):
      1) Permanent panel deformation at: + PSF - PSF.
      2) Seam failure at: + PSF - PSF.
      3) Panel disengagement from clip: + PSF - PSF.
      4) Clip failure: + PSF - PSF.
      5) Fastener withdrawal: + PSF - PSF.
   b. Allowable loads (including safety factors and a 1/3 increase for negative (-) wind loads):
      1) For yielding type failures: (ultimate test load divided by safety factor of 2) + PSF - PSF.
      2) For connection related failure modes: (ultimate test load divided by safety factor of 2.5) + PSF - PSF.
      3) The allowable loads are ( ) greater than, ( ) less than the design loads.
   c. Maximum allowable clip spacing at:
      Zone 1) Main roof = on center.
      Zone 2) Ridge, eave, rake = on center.
      Zone 3) Roof corners = on center.
   d. Fastener manufacturer’s ultimate fastener withdrawal value for the type of fastener submitted:
      1) Existing wood deck = Lbs.
   e. Allowable fastener load per fastener including factor of safety of 2.5 and a leverage factor of 2 (ultimate load divided by rib spacing, divided by clip spacing, divided by factor of safety, divided by leverage factor):
      1) Existing wood deck = Lbs.

3. Fixed point calculations: Provide calculations and a written statement certifying that the strength of the fixed point is adequate to resist sliding forces, including snow and panel weight loads.

4. Manufacturer’s Qualifications Data:
   a. Certified statement that the metal roofing system manufacturer has been actively marketing the proposed standing seam metal roofing system for a minimum of 5 years.
   b. If requested, submit the names and addresses of 5 previous standing seam metal roofing projects of the type specified
herein. Include the size of each project, and name and telephone number of a contact person at the project location.

5. Installer’s Qualifications Data:
   a. Statement from the roof system manufacturer certifying that the installer is licensed or approved to install the roof system.
   b. Statement certifying that the installer has been actively installing concealed clip standing seam metal roofing systems for a minimum of 5 years.
   c. If requested, the names and addresses of 5 previous standing seam metal roofing projects of the type specified. Include the size of each project, the metal roofing manufacturer’s name, and the name and telephone number of a contact person at the project location.
   d. Statement certifying that the supervisor, job foreman or crew chief, and the workers installing the standing seam metal roofing system are qualified architectural sheet metal workers and have had a minimum of 3 years experience in the installation of concealed clip standing seam metal roofing systems.

6. Company Field Advisor Data:
   a. Name, business address and telephone number of Company Field Advisor secured for the required services.
   b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
   c. Services for which authorization is given by the Company, listed specifically for this Project.

F. Maintenance Data: For metal roof panels to include in maintenance manuals.

G. Contract Closeout Submittals:

1.06 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
   1. The manufacturer shall have been actively marketing the proposed concealed clip standing seam metal roofing system for a minimum of 5 years.
   2. The proposed metal roofing system shall have previously been installed on a minimum of 5 roofing projects of comparable scope and complexity to the Work of this Section.

B. Installer’s Qualifications:
   1. The installer shall be licensed or approved by the metal roof system manufacturer.
   2. The installer shall have been actively installing concealed clip metal roofing systems for a minimum of 5 years.
   3. The installer shall have previously installed and completed a minimum of 5 concealed clip metal roofing projects of comparable scope and complexity to the Work of this Section.
4. The people supervising the Work of this Section, the job foreman or crew chief, and the workers installing the metal roofing system, must be qualified architectural sheet metal workers and shall have had a minimum 3 years of experience in the installation of concealed clip metal roofing systems.

C. Source Limitations: Obtain metal roofing system through one source from a single Manufacturer.

D. Field Example: Prior to installation of the Work of this Section, construct a roofing assembly example at the Site. When approved, the example will be the standard of workmanship required for all metal roofing assemblies. The field example will be field fabricated.
   1. Construct a 4 foot long x 3 foot wide outside corner assembly that shows the eave, rake, ridge, and fascia details, and their relationship and connection to each other. Permanently fasten the parts in their proper locations. Include the valley between the main roof / dormer, and part of the dormer in the field-fabricated mock-up of the metal roofing system.
   2. Do not start the metal roofing until the example assembly has been approved in writing by the Director’s Representative.
   3. Maintain the approved example assembly intact until all metal roofing has been installed and approved, then remove the example assembly from the site.

E. Pre-Installation Conference: Prior to commencement of the roofing work, a conference will be scheduled by the Director’s Representative at the site to review the Drawings and Specifications and resolve questions. The conference shall be attended by the Contractor, the authorized system installer, the person supervising the Work, the job foreman or crew chief, and the Company Field Advisor. OGS designers and facility personnel may attend.

1.07 ROOFING MANUFACTURER’S COMPANY FIELD ADVISOR

A. The manufacturer of the roofing system, issuing the final system guarantee on this roofing project, must supply a Company Field Advisor, as a technical representative, with the following minimum qualifications:
   1. Documentation of 5 years of field experience on the same type of roofing system.
   2. Documentation of 10 projects where role was a Company Field Advisor; include contact names and phone numbers for each project.
   3. Documentation of attendance at a roof specific instructional seminar within the last two years.

B. Secure the services of the Company Field Advisor for a minimum of 3 days at a minimum of 4 hours per day to inspect the workmanship of the roofing system installer at the inception of the installation with weekly visits thereafter at a minimum of 4 hours per visit to inspect the ongoing workmanship until such time as the installation is completed.
C. Company Field Advisor Duties and Responsibilities:
1. Become familiar with the Contract Documents and approved submittals prior to the pre-siding and roofing conference.
2. Attend the pre-roofing conference and the beginning of the actual membrane installation for the purpose of:
   a. Rendering technical assistance to the Contractor regarding installation procedures of the system.
   b. Familiarizing the Director’s Representative with all aspects of the system including inspection techniques.
   c. Answering questions that might arise.
3. Attend each bi-weekly meeting.
4. Be objective, unbiased and impartial in each inspection, recommendation, conversation, action and written report.
   a. Inspect and approve the existing substrate, flashing, blocking, and related materials as being acceptable for the installation of the roofing system.
   b. Ensure proper fastening patterns and fastener sizes of wood blocking, insulation, edge flashing, and related components.
5. Immediately report non-compliant conditions, if any, to the Director’s Representative.
6. Provide to the Director’s Representative a written report, submitted prior to leaving the Project Site each day the Company Field Advisor is present. Each daily written report shall contain at a minimum:
   a. Date of report and inspection.
   b. Weather conditions at the start, middle, and end of the work day.
   c. Work performed including Contractor activity, contractor crew size, supervisor’s name, area of activity, and progress and quality of the work as observed.
   d. Discussions with Contractor regarding work anomalies and resolution.
   e. Conditions that are not in compliance with the Contract documents.
      1) Continue documenting non-compliance issues in subsequent reports until the issue has been resolved. Document resolution of non-compliance issues when resolved.
7. Report to the Director’s Representative in writing failure or refusal of the Contractor to correct unacceptable practices called to the Contractor’s attention.
8. Confirm, after completion of the siding and roofing work and based on the Company Field Advisor’s inspections and tests, that the Company Field Advisor has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store metal panels flat on slightly sloped, raised platforms. Store preformed and prefinished materials in a manner that will prevent twisting, bending or abrasion.
B. Handle materials by methods which will prevent damage to components, including finishes.

C. Lift up prefinished panels when unstacking; do not slide.

D. Remove damaged or permanently stained materials from the site.

1.09 PROJECT CONDITIONS

A. Unless directed otherwise, do not execute the Work of this Section unless the Director’s Representative is present.

B. Do not install the Work of this Section unless the substrate is dry and free of dirt and debris.

1.10 WARRANTY

A. Special Warranty: The one year period required by Paragraph 9.8 of the General Conditions is extended to 2 years for the Work of this Section. Refer to Supplementary Conditions 007306.

B. Special Warranty on Panel Finishes: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   d. Finish Warranty Period: 30 years from date of final Completion.

C. Manufacturer’s Warranties:
   1. Wind Speed: Up to 73 mph.
   2. Furnish a single source warranty issued by the roofing system manufacturer for the Work of this Section as follows:
      a. Twenty year, no leak weather tightness warranty covering workmanship and all materials provided by the metal roof manufacturer.
      b. Thirty Year Finish Warranty for all elements of the roofing and siding systems including, but not limited to; corrosion, rust, finish durability, and other defects which would impair the aesthetic or waterproofing properties of the roofing and siding system.
      c. The warranty shall include, but not be limited to; repair and/or replacement of the roofing and siding panels, gable and eave
trim, flashings, penetrations, underlayments and as necessary to correct defects in materials or workmanship.

D. Warranties shall commence on the date of completion of the roof when accepted.

PART 2   PRODUCTS

2.01   MATERIALS

A. (SALT STORAGE) Structural Standing Seam Roof Panels: Prefinished, AZ55 galvalume, 24 gauge minimum, steel sheet ASTM A 792, fabricated from “tension leveled” coil stock and meeting the following criteria;

1. “Oil Canning”: Excessive oil canning in individual roof panels or throughout the roof area is not permitted, however minor oil canning that is not readily apparent to the eye and does not detract from the aesthetic look of the building is acceptable provided that it only occurs on a minimum number of panels. Acceptance or rejection of individual roof panels or the finished roof based on oil canning will be at the sole discretion of The Director’s Representative.
2. Panel Width: 10 inches.
3. Panel Length: Continuous up to 40 feet with no end laps. Runs over 40 feet may have one end lap.
4. Stiffening Ribs: The panels may be formed with stiffening ribs, but the ribs must be small enough to allow the panel to be bent over the roof edge to form a hem with an inside bend of 2T without distorting or cracking the rib or paint finish.
5. Seam Configuration: Form the seams with vertical ribs at 90 degrees to the panel face. Acceptable seam types are as follows:
   a. Mechanically Finished Seam: The ribs shall be a minimum of 2 inches high and designed so that the panels can be securely interlocked to each other with an electric seaming machine. Provide factory applied in-seam sealant. Trapezoidal shaped seams are not allowed.

Acceptable Seam Configurations

B. (YEAGER GARAGE) Structural Low Profile Seam Roof Panels: Prefinished, AZ55 galvalume, 24 gauge minimum, steel sheet ASTM A 792, fabricated from “tension leveled” coil stock and meeting the following criteria;

1. “Oil Canning”: Excessive oil canning in individual roof panels or throughout the roof area is not permitted, however minor oil canning that is not readily apparent to the eye and does not detract from the aesthetic look of the building is acceptable provided that it only occurs on a minimum number of panels. Acceptance or rejection of individual roof panels or the finished roof based on oil canning will be at the sole discretion of The Director’s Representative.
panels or the finished roof based on oil canning will be at the sole discretion of The Director’s Representative.

2. Panel Width: 10 inches minimum and 16 inches maximum.

3. Panel Length: Continuous up to 40 feet with no end laps. Runs over 40 feet may have one end lap.

4. Stiffening Ribs: The panels may be formed with stiffening ribs, but the ribs must be small enough to allow the panel to be bent over the roof edge to form a hem with an inside bend of 2T without distorting or cracking the rib or paint finish.

5. Seam Configuration: Form the seams with vertical ribs at 90 degrees to the panel face. Acceptable seam types are as follows:
   a. Mechanically Finished Seam: The ribs shall be a low profile designed so that the panels can be securely interlocked to each other with an electric seaming machine or mechanically fastensed. Provide factory applied in-seam sealant. Trapezoidal shaped seams are not allowed.

C. Finish: Full strength 70 percent Kynar 500 Fluorocarbon Coating (polyvinylidene fluoride, PVF) applied by the coil coating process. Minimum dry film thickness .9 mil.
   1. Cover concealed side with the manufacturer’s standard protective finish.

D. Concealed Clips:
   1. One Piece Clips: One piece clips are only allowed on snap and interlocking seams, and on mechanical seams when the clip does not extend into the folded lock portion of the seam. Provide the panel manufacturer’s one piece clip designed to allow maximum expansion and contraction of the roof relative to the structure within a minimum ambient temperature range of 200 degrees F.
      a. The clip shall support the pan section of the metal roofing panels so that the panel does not come in contact with the clip mounting screws.

E. Bearing Plates: Roof panel manufacturer’s 16 gage galvalume steel plates. Minimum 6 inches square with 2 predrilled fastener holes to mate with holes in clip.

F. Blocking At Eaves and Ridge: 5/4 x pressure treated wood blocking. Blocking shall finish flush with the top of the insulation.

G. Exposed Fasteners:
   1. For Securing All Components Of The Metal Roof System, Except Panel End Laps, To Wood Blocking, Framing and/or Plywood,
      a. Type A Fasteners: Manufactured of H3 or 300 series stainless steel with cadmium plating. Fasteners shall have a minimum diameter of #14.
         1) For weather tightness, fasteners shall have an aluminum or stainless steel dish type washer with hot bonded EPDM or neoprene faces. Aluminum or stainless steel shall be a minimum thickness of 20 gage. EPDM or
neoprene shall have a minimum thickness of .065 inch. The minimum outside diameter of the sealing washer shall be 5/8 inch.

2. For Securing Sheet Metal thru 5/8” pressure treated plywood to metal framing, one of the following as indicated on the Drawings:
   a. Rivets: Stainless steel, minimum diameter 3/16 inch.
   b. Type A Fasteners; Manufactured of H3 or 300 series stainless steel with cadmium plating. Fasteners shall have a minimum diameter of #14.
      1) For weather tightness, fasteners shall have an aluminum or stainless steel dish type washer with hot bonded EPDM or neoprene faces. Aluminum or stainless steel shall be a minimum thickness of 20 gage. EPDM or neoprene shall have a minimum thickness of .065 inch. The minimum outside diameter of the sealing washer shall be 5/8 inch.

3. For Securing Roof Panel End Laps:

4. Color Finish for Exposed Surfaces of Fasteners: Paint all fasteners to match color of panels, trim, and accessories being fastened.

H. Sealant:
   1. Exposed Sealant: ASTM C 920; elastomeric polyurethane sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain watertight; and as recommended in writing by metal roof panel manufacturer. Color to match metal panel as close as possible.
   2. Concealed Sealant:
      a. Preformed Tape Sealant: Pressure-sensitive, 99 percent solids, gray butyl rubber compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape 1 inch wide and 1/16 inch thick minimum containing nylon spacer beads
      b. Type 3 Sealant: One part butyl rubber sealant specified in Section 079200.

I. Flashings and Trim:
   1. Metal Flashings and Trim: Prefinished, 24 gage galvalume steel panels ASTM A 792.
      a. Panels for flashing and trim shall be manufactured by the roof panel manufacturer.
      b. Color and finish of flashings and trim shall be the same as the roof panels.
J. (YEAGER STORAGE ONLY) 2 inches of Rigid (Board) Insulation: Rigid cellular polyurethane or polyisocyanurate thermal insulation boards surfaced with other materials; ASTM C591.

1. Aged R-Value:
   a. 2 Inches Thick: R = 12.1 @ 40 degrees F and 14.4 @ 75 degrees F. as specified and as shown on the drawings.


L. Touch Up Paint: Panel manufacturers recommended paint compatible with the panel finish. Color to match the exposed surfaces.

M. Foam Closures: Factory precut closed cell foam meeting ASTM D1056, matching roofing and siding panel profile when used at ridge, rakes, head, jambs, bottoms and tops of siding panels.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive the metal roofing system for defects that will adversely affect the execution and quality of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Install the Work of this Section in accordance with the Contract Documents, the approved shop drawings and approved deviations (if any) from the Contract Documents.

1. Coordinate the installation of the metal roofing system with other Work of the Contract.
2. Install the Work of this Section so the system is secure, watertight, plumb, and straight and true to adjacent work.
3. Exposed metal shall be free of visible dents, scratches, tool marks, cuts, and other imperfections.
4. Paint to match adjacent surfaces, all exposed edges of metal roof panels and flashings which have been cut to install the work of this Section.
5. The type and size of power screwdrivers used shall be properly matched to the fastener and shall be equipped with depth sensing nose pieces and slip clutches to prevent overdriving and stripping. Use the fastener manufacturer’s recommended power screwdriver.
6. Use sealing washers at all locations on the roof panels and roof flashings where exposed fasteners are required. Do not use sealing washers on vertical siding panels or siding trim.
7. To prevent fastener heads from coming in contact with the underside of the metal panels at the eaves and rakes, form the trim with a 1/4 inch deep step down where the fasteners are to be installed.
B. Installing Wood Blocking At Eaves, Rakes, Ridges, and Base Flashings: Install wood blocking as indicated on the Drawings. Secure the wood blocking through the structural deck to the framing members, and to the structural deck one foot on center.

C. Installing Concealed Flashing: Install concealed flashing over the insulation at eaves and at any other areas indicated on the Drawings.
   1. Follow the manufacturer’s installation instructions. Unsealed lap joints and holes which will allow the passage of moisture will not be allowed.
   2. Install the concealed flashing so that the flow of water is not against the edges of the sheets. Lap edges and ends a minimum of 3 inches.
   3. Broom the surface of the sheets to insure that the vapor retarder is firmly attached to the substrate and that all lap joints are sealed.
   4. Repair punctures and other defects immediately.

D. Installing Spreader Plates and Concealed Clips:
   1. Secure the concealed clips and spreader plates to the structural deck at the center line of each panel joint. Accurately align the clips so that the panels will not be distorted when they are secured to the clips.
      a. Secure each clip and spreader plate with 2 fasteners.

E. Installing Metal Roof Panels:
   1. Layout the panels so that the standing seams of the end panels at each rake are equidistant from each end.
   2. Install the panels so they are in straight alignment, and free of buckles or distortions.
      a. Maximum lateral camber per panel is not to exceed 1/2 inch in 100 feet.
   3. Install all panels up to 40 feet long in one continuous length from eave to ridge.
   4. Securely interlock adjoining panels to each other. Where machine seaming is required, use the type of seamer recommended by the manufacturer for the specific type seam.
      a. The finished seam shall be vertical to the panel face with no buckles, wrinkles, or distortions.
   5. Except where shown or specified otherwise, do not rigidly fasten panels to the deck or to structural members.
   6. Fixed Securement Point:
      a. The fixed securement point of the panels shall be at the eave.

F. Hydrostatic Eave Flashing:
   1. Set panel in run of butyl tape set over eave flashing. Fasten through panel, butyl tape, and eave flashing into structural member or wood blocking below. Use a minimum 4 fasteners per panel.

G. Ridges and Hips: Allow for panel expansion provisions at ridge cap detail.
   1. Apply 1 inch wide sealant tape on the top and bottom flanges of the closure. Set the tape 1/4 inch in from the finished edges of the closure.
2. Fasten the panel closure to the metal panels and compression plate on the concealed side of the panel closure with a minimum of 4 Type A fasteners between the ribs of each roof panel.
3. Secure the ridge cap to the panel closure with 3 fasteners per panel.
4. Apply urethane sealant around all four sides of the closure.

H. Installing Roof Flashings, Trim, and Accessories:
1. Form and install flashings, trim, and accessories as detailed and specified in the contract documents unless approved otherwise by the Director.
2. Do not fasten flashings, trim, or accessories, in any way that will restrict differential movement caused by expansion and contraction.
3. Installing Valley Flashings: Set panel in run of double-sided-adhesive butyl tape set over valley flashing. Fasten through panel, butyl tape, and valley flashing into structural member to wood blocking below. Use a minimum 4 fasteners per panel.
4. Installing Metal Panel Closures: Where metal panel closures are required, form the closures to fit snugly against all adjoining surfaces so there are no gaps.
   a. Base Flashing Closures:
      1) When panel closures are installed parallel to the slope of the roof, lap the ends so they are not against the flow of water.
      2) Apply one inch wide sealant tape between end laps and on all surfaces of the panel closure that will be in contact with adjoining surfaces. Set the tape 1/4 inch in from the finished edges of the panel closure.
      3) Fasten the panel closure to the metal panels on the concealed side of the panel closure with a minimum of 4 fasteners. Fasten the vertical leg of the panel closure at the ends.
      4) Apply 1”butyl tape sealant along the concealed edges of the panel closure. Remove excess sealant.
5. Installing Hydrostatic Rake Flashings:
   a. Allow for rake to move with the panel system. Ensure hydrostatic seal along rake-to-panel transition.

3.03 ADJUSTING

A. Restore minor visual damage to factory applied finishes in a manner to match the appearance and performance of the original finish, or remove the damaged parts and replace them with undamaged parts.

3.04 CLEANING

A. Remove strippable protective coatings; if any, immediately after completion of Work.

B. Clean exposed exterior surfaces. Remove residue from strippable coatings. Comply with manufacturer’s printed instructions for cleaning.
END OF SECTION
PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Rough Carpentry: Section 061000.

B. Wood Nailers and Blocking: Section 061053.

1.02 REFERENCES


1.03 SYSTEM DESCRIPTION

A. Metal flashings, trim, and related accessories that form terminations and waterproof connections.

1.04 SUBMITTALS

A. Product Data: Catalog sheets, specifications, installation instructions for each item specified except for shop or job formed items, solder, flux, and bituminous paint.

B. Samples:
   1. Materials for Flashings: One 6 inch sq piece, for each type material specified.
   2. Anchors: Six, each type required.
   3. Reglet Cap Flashings: Full section, 6 inches long.
   4. Manufacturer Standard Color chart for prefinished galvalume steel from metal roofing manufacturer.

1.05 QUALITY ASSURANCE

A. Except as otherwise shown or specified, comply with applicable recommendations, details, and standards of CDA, and SMACNA.

B. Manufacturer’s Recommendations: For factory fabricated items, follow the manufacturer’s recommendations and installation instructions unless specifically shown or specified otherwise.

1.06 PROJECT CONDITIONS
A. Do not execute the Work of this Section unless the Director’s Representative is present, or unless he directs that the Work be performed during his absence.

B. Make the roof and all uncompleted flashings watertight at the end of each work day.

PART 2 PRODUCTS

2.01 MATERIALS FOR FLASHING FABRICATION

A. Prefinished Galvalume Steel Sheet: Commercial quality, extra smooth, hot dip galvanized, mill phosphatized galvanized steel sheet, ASTM A 525/526.
   2. Color: As selected by the OGS Director’s Representative from manufacturer’s standard colors.

B. Pitch Pockets:
   1. Stainless Steel: 26 ga (.018 inch).

2.02 FASTENERS

A. Nails: “Stronghold” type large flat head roofing nail.
   1. For Galvalume: Galvalume.

B. Screws, Bolts, and Other Fastening Accessories:
   1. For Galvalume: Stainless steel.

C. Anchors: Provide one of the following types:
   1. Hammer driven anchors, consisting of a stainless steel drive pin and a plastic or corrosion resistant metal expansion shield inserted thru a stainless steel disc with an EPDM sealing washer.
   2. Self-tapping, corrosion resistant, concrete and masonry screw inserted thru a stainless steel disc with an EPDM sealing washer.

2.03 MISCELLANEOUS MATERIALS

A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

B. Solder: Composition of block tin/pig lead of proportion recommended by the metal manufacturer.

C. Flux: Paste or acid type as recommended by the metal manufacturer.

D. Materials for Pitch Pockets:
   1. Mortar: ASTM C 270, Type S.
   2. Elastomeric Cement: Non-sag, cold applied, trowel grade, single component rubber elastomer with minimum elongation of 400 percent, supplied by the membrane manufacturer to satisfy warranty requirements.
2.04 FABRICATION
A. Where practicable, form and fabricate sheet metal Work in the factory or shop. Produce bends and profiles accurately to the indicated shapes. Where not indicated or specified, follow the applicable requirements of the reference standards listed in PART 1.
B. Reglet Cap Flashing:
   1. Pre Finished Galvalume Steel: 24 ga (.023 inch).

PART 3 EXECUTION

3.01 EXAMINATION
A. Coordinate the Work of this Section with other Work for the correct sequencing of items that make up the entire system of weatherproofing or waterproofing.

3.02 PREPARATION
A. Do not install the Work of this Section unless all necessary nailers, blocking and other supporting components have been provided.
B. Do not install the Work of this Section unless all substrates are clean and dry.

3.03 INSTALLATION
A. Isolation: Separate dissimilar metals from each other with bituminous paint.
B. Tinning and Soldering:
   1. Remove all factory applied finishes to bare metal at all areas to be soldered.
   2. Clean, flux and tin all surfaces to be soldered.
   3. Sweat solder thoroughly into seams, completely filling the seam for the full width.
   4. Upon completion of soldering, remove all traces of flux residue, and if required, apply a neutralizing wash followed by a clean water wash.
C. Touch-Up Painting: After all prefinished galvalume steel flashings have been installed, apply the metal coating manufacturer’s touch-up paint to all soldered areas and all other areas where the finish has been damaged.
D. Installing Cap Flashing:
   1. Cap Flashing for Installation In Reglets:
      a. Extend the built in portion of the cap a min of 3/4 inch into the reglet. Form the edge of the built in portion with a 1/4 inch hook dam.
      b. Secure the cap with lead wedges 8 inches oc. Fill joint completely with Type 2 sealant and tool to a slightly concave surface.
E. Installing Pitch Pockets:
1. Form the pitch pocket with 4 inch wide flashing flanges. Extend the pitch pocket a minimum of 3 inches above the roof membrane and a minimum of one inch beyond the roof penetration.

2. Solder all construction joints.

END OF SECTION

CD:je
SECTION 079200

JOINT SEALERS

PART 1   GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Flashing and Trim: Section 076000.

1.02 SUBMITTALS

A. Product Data: Catalog sheets, specifications, and installation instructions for each product specified except miscellaneous materials.

B. Samples:
   1. Sealants: One pint or standard tube.

C. Quality Control Submittals:
   1. Installer's Qualifications Data: Affidavit required under Quality Assurance Article.
   2. Company Field Advisor Data: Name, business address, and telephone number of Company Field Advisor.

1.03 QUALITY ASSURANCE

A. Installer's Qualifications: The persons installing the sealants and their supervisor shall be personally experienced in the installation of sealants and shall have been regularly employed by a company engaged in the installation of sealants for a minimum of two years.
   1. Furnish to the Director the names and addresses of five similar projects which the foregoing people have worked on during the past two years.
   2. Furnish a letter from the sealant manufacturer, stating that the foregoing people are authorized to install the manufacturer's sealant materials and that the manufacturer's specifications are applicable to the requirements of this Project.

B. Container Labels: Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable), and packaging date or batch number.

C. Test and validate sealants used for exterior weather sealing per the Sealant Waterproofing Restoration Institute (SWRI).

D. Warranties:
   1. Silicone sealants: 20 years Weatherseal Warranty.
   2. Polyurethane or Silicone: 5 year Weatherseal Warranty.
1.04 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Temperature: Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40 degrees F or above 85 degrees F for non-silicone sealants and below minus 20 degrees F or above 125 degrees F for silicone sealants.
   2. Humidity and Moisture: Do not install the Work of this section under conditions that are detrimental to the application, curing, and performance of the materials.

B. Protection:
   1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.
   2. Protect all other surfaces in the Work area with tarps, plastic sheets, or other approved coverings to prevent defacement from droppings.

PART 2 PRODUCTS

2.01 SEALANTS

A. Type 1 Sealant, any of the following generic types:
   1. One-part, low-modulus silicone sealant: Dow Corning 790, Dow Corning 791, Dow Corning 795, General Electric Silpruf, Pecora 864, Pecora 890, Pecora 890FTS.
   2. One-part, non-sag silicone or polyurethane sealant: Bostik Chem-Calk 900, Bostik Chem-Calk 915, Bostik Chem-Calk 916 Textured, Bostik Chem-Calk 2020, Pecora Dynatrol I, Sika Sikaflex 1a, Sonneborn Sonolastic NP I, or Tremco DyMonic (not SWRI), Dow Corning Contractors Weatherproofing Sealant (CWS), Dow Corning Concrete Sealant (CCS), Pecora 895.
   3. Two-part, non-sag silicone or polyurethane sealant: Bostik Chem-Calk 500 (not SRWI), Pecora Dynatrol II, Dow Corning CWS or CCS.

B. Type 2 Sealant: One-part acrylic polymer sealant; Pecora AVW-920, PTI 738, or Tremco Mono.

C. Type 3 Sealant: One-part butyl rubber sealant; Pecora BC-158, PTI 707, or Bostik Chem-Calk 300 (not SWRI).

D. Sealant Colors: For exposed materials provide color as indicated or, if not indicated, as selected by the Director from manufacturer's standard colors. For concealed materials, provide the natural color which has the best overall performance characteristics.
2.02 MISCELLANEOUS MATERIALS

A. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.

B. Backer Rod: Compressible rod stock of expanded, extruded polyethylene.

C. Bond Breaker Tape: Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant; self adhesive where applicable.

D. Cleaning Solvents: Oil free solvents as recommended by the sealant manufacturer. Do not use re-claimed solvents.

E. Masking Tape: Removable paper or fiber tape, self-adhesive, non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine all joint surfaces for conditions that may be detrimental to the performance of the completed Work. Do not proceed until satisfactory corrections have been made.

3.02 PREPARATION

A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.
1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section.
2. Remove lacquers, protective coatings and similar materials from joint faces with manufacturer's recommended solvents.
3. Do not limit cleaning of joint surfaces to solvent wiping. Use methods such as grinding, acid etching or other approved and manufacturer's recommended means, if required, to clean the joint surfaces, assuring that the sealant materials will obtain positive and permanent adhesion.

B. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods, and sealants. Do not leave voids or gaps between the ends of joint filler units.

C. Priming Joint Surfaces:
1. Prime joints of friable (crumbly, chalky) masonry surfaces which are to receive Type 1 Sealant.
2. Prime joints other than those above if so recommended by the manufacturer's printed instructions.
3. Do not allow the primer/sealer to spill or migrate onto adjoining surfaces.
3.03 JOINT BACKING INSTALLATION

A. Install backer rod of sufficient size to fill the joint width at all points in a compressed state. Compress backer rod at the widest part of the joint by a minimum of 25 percent. Do not cut or puncture the surface skin of the rod.

3.04 SEALANT INSTALLATION

A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.

B. Install sealants with ratchet hand gun or other approved mechanical gun. Where gun application is impractical, install sealant by knife or by pouring as applicable.

C. Types 2 Sealant: If low temperature makes application difficult, preheat sealants using manufacturer's recommended heating equipment.

D. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant, eliminating all air voids and providing a neat smoothly finished joint. Provide slightly concave joint surface, unless otherwise indicated or recommended by the manufacturer.
   1. Use tool wetting agents as recommended by the sealant manufacturer.

3.05 FIELD QUALITY CONTROL

A. Test Samples:
   1. Where directed, for each 500 linear feet of joint installed, cut out and carefully remove a 6 inch long sample of the undisturbed sealant and joint backer material from the newly installed Work. Remove the samples in the presence of the Director's Representative who will retain them for evaluating and testing.
   2. Reseal cut out areas with the same materials.

3.06 CLEANING

A. Immediately remove misapplied sealant and droppings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.

B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up remaining defacement caused by the Work.

END OF SECTION