MAINE TURNPIKE AUTHORITY

ADDENDUM NO. 1

CONTRACT 2025.11

AUBURN VEHICLE STORAGE GARAGE

MILE 76.9

The bid opening date is May 22, 2025 at 11:00 A.M.

A pre-bid conference will be held on May 13, 2025 at 10:00 A.M. at Maine Turnpike Authority.

The following changes are made to the Proposal, Specifications and Plans. Refer to the Questions section for additional information.

GENERAL

All questions regarding Contract 2025.11 should be submitted by Noon on May 15, 2025 to be answered by Addendum on or before May 20, 2025. Questions received after that time may not be answered.

PROPOSAL

• Intentionally left blank.

SPECIFICATIONS

The Table of Contents for Division 10 through Division 28 shall be deleted in their entirety and replaced with the updated Table of Contents, Division 02 through 28.

Division 13 Special Construction, Section 133419 Metal Building Systems shall be added to the Specifications.

PLANS

Intentionally left blank.

OUESTIONS

The following are questions submitted to the Maine Turnpike Authority in writing. Answers to the questions are noted. Bidders shall utilize this information in preparing their bid.

Question 1:	 Division 13 Specification for the pre-engineered metal building is missing from the Specifications. Can you please provide? <u>Answer:</u> Yes, the Division 13 Specification and a revised Division Table of Contents is included in this Addendum.
Question 2:	If Liquidated Damages apply to this contract, can you please provide a table or schedule of values. <u>Answer:</u> Yes, see Supplemental Specification 107.7 Liquidated Damage which includes a Schedule of Liquidated Damages under section 107.7.2.
Question 3:	Will approval drawings be required for the pre-engineered metal building prior to releasing the order?

Answer: Yes. See Division 13, Section 133419 Metal Building Systems.

ATTACHMENTS

- (This document Addendum #1 (3 pages))
- Specification sheets Table of Contents (3 pages)
- Specification sheets Section 133419 (20 pages)
- •

Notes: The above items shall be considered as part of the bid submittal.

The total number of pages included in this addendum is twenty six (26) pages.

All bidders are requested to acknowledge the receipt of the Addendum No. 1 by signing below and faxing this sheet to Nathaniel Carll, Purchasing Department, Maine Turnpike Authority at 207-871-7739. Bidders are also required to acknowledge receipt of this Addendum No. 1 on Page P-8 of the bid package.

Business Name

Print Name and Title

Signature

Date

Very truly yours,

MAINE TURNPIKE AUTHORITY

Nathaniel Carll Purchasing Department Maine Turnpike Authority Division Section Title

SPECIFICATIONS GROUP

Facility Construction Subgroup

DIVISION 02 - EXISTING CONDITIONS

024119 SELECTIVE DEMOLITION

DIVISION 03 – CONCRETE

033000 CAST-IN-PLACE CONCRETE

DIVISION 05 – METALS

055000 METAL FABRICATIONS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

- 061053 MISCELLANEOUS ROUGH CARPENTRY
- 061600 SHEATHING
- 062013 EXTERIOR FINISH CARPENTRY
- 062023 INTERIOR FINISH CARPENTRY

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

- 072100 THERMAL INSULATION
- 072500 WEATHER BARRIERS
- 072600 VAPOR RETARDERS
- 073113 ASPHALT SHINGLES
- 076200 SHEET METAL FLASHING AND TRIM
- 077200 ROOF ACCESSORIES
- 077253 SNOW GUARDS
- 079200 JOINT SEALANTS

DIVISION 08 – OPENINGS

- 081113 HOLLOW METAL DOORS AND FRAMES
- 083613 SECTIONAL DOORS
- 085313 VINYL WINDOWS
- 087100 DOOR HARDWARE
- 088000 GLAZING

DIVISION 09 – FINISHES

- 092216 NON-STRUCTURAL METAL FRAMING
- 099113 EXTERIOR PAINTING
- 099123 INTERIOR PAINTING

DIVISION 10 – SPECIALTIES

101423.13 ROOM-IDENTIFICATION SIGNAGE

DIVISION 13– SPECIALTIES

133419 METAL BUILDING SYSTEMS – Addendum 1

Facility Services Subgroup

DIVISION 22 – PLUMBING

- 220500 COMMON WORK RESULTS FOR PLUMBING
- 220519 THERMOMETERS AND PRESSURE GAUGES FOR PLUMBING
- 220529 HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
- 220533 HEAT TRACING FOR PLUMBING PIPING
- 220553 IDENTIFICATION FOR PLUMBING PIPING & EQUIPMENT
- 220700 PLUMBING INSULATION
- 221116 DOMESTIC WATER PIPING
- 221119 PLUMBING SPECIALTIES
- 221123.13 DOMESTIC-WATER PACKAGED BOOSTER PUMPS
- 221316 PLUMBING SANITARY AND STORM PIPING
- 221513 GENERAL-SERVICE COMPRESSED-AIR PIPING
- 223300 ELECTRIC WATER HEATERS
- 224000 PLUMBING FIXTURES

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- 230500 COMMON WORK RESULTS FOR MECHANICAL
- 230519 THERMOMETERS AND PRESSURE GAUGES
- 230529 HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT
- 230553 IDENTIFICATION FOR MECHANICAL
- 230593 TESTING, ADJUSTING, AND BALANCING FOR HVAC
- 230700 MECHANICAL INSULATION
- 230993 SEQUENCE OF OPERATIONS
- 231123 FACILITY FUEL GAS PIPING
- 233113 DUCTWORK
- 233423 POWER AND GRAVITY VENTILATORS
- 235123 GAS VENTS
- 235533 FUEL-FIRED UNIT HEATERS

DIVISION 26 – ELECTRICAL

- 260100 BASIC ELECTRICAL REQUIREMENTS
- 260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- 260526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
- 260529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
- 260533 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

260543	UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
260544	SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND

- 260544 SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING
- 260548 SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS
- 260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS
- 260923 LIGHTING CONTROL DEVICES
- 262416 PANELBOARDS
- 262713 ELECTRICITY METERING
- 262726 WIRING DEVICES
- 262813 FUSES
- 262816 ENCLOSED SWITCHES AND CIRCUIT BREAKERS
- 262913 ENCLOSED CONTROLLERS
- 263213 ENGINE GENERATORS
- 263600 TRANSFER SWITCHES
- 265119 LED INTERIOR LIGHTING
- 265219 EMERGENCY AND EXIT LIGHTING
- 265600 EXTERIOR LIGHTING

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

- 280513 CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY
- 283111 DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

END OF TABLE OF CONTENTS

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural-steel framing.
 - 2. Metal roof panels.
 - 3. Insulated metal wall panels.
 - 4. Thermal Insulation
 - 5. Accessories.

B. Related Requirements:

- 1. 077253 Snow Guards
- 2. 081113 Hollow Metal Doors and Frames
- 3. 083613 Sectional Doors
- 4. 085313 Vinyl Windows

1.2 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.3 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."
- B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak proof, secure, and noncorrosive installation.

1.4 SUBMITTALS

- A. Product Data: For each type of metal building system component.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Metal Roof Panels

- b. Insulated Metal Wall Panels
- c. Metal soffit panels.
- d. Thermal insulation and vapor-retarder facings.
- e. Structural-steel framing system
- f. Accessories.
- B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:
 - 1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
 - 2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 - 3. Insulated Metal Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory-and field-assembled work; show locations of exposed fasteners.
 - a. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
 - 4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches
 - a. Flashing and trim.
- C. Samples for Initial Selection: For units with factory-applied finishes.
- D. Samples for Verification: For the following products:
 - 1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
 - 2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
 - 3. Vapor-Retarder Facings: Nominal 6-inch-square Samples.
 - 4. Windows: Full-size, nominal 12-inch-long frame Samples showing typical profile.
 - 5. Accessories: Nominal 12-inch-long Samples for each type of accessory.
- E. Delegated-Design Submittal: For metal building systems.
 - 1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Qualification Data: For erector, manufacturer, professional engineer, and testing agency.

- G. Welding certificates.
- H. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Name and location of Project.
 - 2. Order number.
 - 3. Name of manufacturer.
 - 4. Name of Contractor.
 - 5. Building dimensions including width, length, height, and roof slope.
 - 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 - 7. Governing building code and year of edition.
 - 8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
 - 9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
 - 10. Building-Use Category:

a. <u>This Building shall be designed as a Category IV – Essential Building</u>

- I. Erector Certificates: For qualified erector, from manufacturer.
- J. Material Test Reports: For each of the following products:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shop primers.
 - 5. Non-shrink grout.
- K. Source quality-control reports.
- L. Field quality-control reports.
- M. Sample Warranties: For special warranties.
- N. Maintenance Data: For metal panel finishes to be include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer.
 - 1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
 - 2. Engineering Responsibility: Preparation of comprehensive engineering analysis and

Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

- B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code Steel."
 - 2. AWS D1.3, "Structural Welding Code Sheet Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.7 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.8 WARRANTY

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
 - 2. Ceco Building Systems; an NCI company.
 - 3. MESCO BUILDING SOLUTIONS; Irving, TX 75061Nucor Building Systems.
 - 4. Varco-Pruden Buildings; A division of BlueScope Buildings North America, Inc.
- B. Source Limitations: Obtain metal building system components, including primary and secondary framing from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

- A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.
- B. Primary-Frame Type:
 - 1. Rigid Modular: Solid-member, structural-framing system with interior columns.
- C. End-Wall Framing: Provide primary frame, capable of supporting full-bay design loads, and end-wall columns.
- D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.
- E. Eave Height: Noted on Architectural Drawing sections.
- F. Bay Spacing: As indicated on Drawings.
- G. Roof Slope: As indicated on Drawings.
- H. Roof System: Manufacturer's standard standing-seam, vertical-rib, metal roof panels.
 - 1. Liner Panels: Tapered rib.
- I. Exterior Wall System: Manufacturer's standard concealed-fastener, flush profile, insulated metal wall panels.

2.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer to design metal building system.
 - 1. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
 - a. Design Loads: As indicated on Drawings.
 - Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
 - c. Deflection and Drift Limits: No greater than the following:
 - 1. Purlins and Rafters: Vertical deflection of 1/240 of the span.
 - 2. Girts: Horizontal deflection of 1/180 of the span.
 - 3. Metal Roof Panels: Vertical deflection of 1/240 of the span.
 - 4. Metal Wall Panels: Horizontal deflection of 1/180 of the span.
 - 5. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
 - 6. Lateral Drift: Maximum of 1/200 of the building height.
- B. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Seismic Design Parameters: As noted on Sheet S-000.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- D. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
 - 1. Wind Design Parameters: Per Wind Speed noted on Sheet S-001.
- E. Air Infiltration for Metal Wall Panels: Comply with 2021 IECC performance requirements, and provide air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- F. Water Penetration for Metal Wall Panels: No water penetration when tested according to

ASTM E 331 at the following test-pressure difference:

- 1. Test-Pressure Difference: 6.24 lbf/sq-ft.
- G. Thermal Performance for Opaque Elements: Comply with 2021 IECC performance requirements, and provide air the following maximum U-factors and minimum R-values when tested according to ASTM C 1363 or ASTM C 518:
 - 1. Roof:
 - a. U-Factor: 0.031.
 - b. R-Value: R-25 + R-11 LS.
 - 2. Walls:
 - a. U-Factor: 0.050.
 - b. R-Value: R-13 + R-14 CI.

2.4 STRUCTURAL-STEEL FRAMING

- A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."
- B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.
 - 2. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, builtup steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipes or tubes, or shop-welded, built-up steel plates.
 - 3. Frame Configuration: Single gable.
 - 4. Exterior Column: Tapered.
 - 5. Rafter: Tapered.
- E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for fieldbolted assembly to comply with the following:
 - 1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet.

- 2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, pre-painted with coil coating, to comply with the following:
 - 1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
 - a. Depth: As needed to comply with system performance requirements.
 - 2. Purlins (Optional): Steel joists per Specification Section 052100
 - 3. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch-wide flanges.
 - a. Depth: As required to comply with system performance requirements.
 - 4. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
 - 5. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inchdiameter, cold-formed structural tubing to stiffen primary-frame flanges.
 - 6. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
 - 7. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch, fabricated from zinc-coated (galvanized) steel sheet.
 - 8. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
 - 9. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
 - 10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- G. Bracing: Provide one of the following adjustable wind bracing:
 - 1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50; or ASTM A 529/A 529M, Grade 50; minimum 1/2-inch-diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
 - Cable: ASTM A 475, minimum 1/4-inch-diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
 - 3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
 - 4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
 - 5. Fixed-Base Columns: Fabricated from shop-welded, built-up steel plates or structuralsteel shapes to match primary framing; of size required to withstand design loads.
 - 6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through

diaphragm action of metal panels.

- H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.
- I. Materials:
 - 1. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.
 - 2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.
 - 3. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55; or ASTM A 529/A 529M, Grade 50 or 55.
 - 4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
 - 5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
 - Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70; or coldrolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80, or HSLAS, Grades 45 through 70.
 - 7. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G60 coating designation; mill phosphatized.
 - 8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, SS, Grades 33 through 80, or HSLAS or HSLAS-F, Grades 50 through 80; with G90 coating designation.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, SS, Grade 50 or 80; with Class AZ50 coating.
 - 9. Steel Joists: Manufactured according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders"; with steel-angle, top- and bottom-chord members, and end- and top-chord arrangements as indicated on Drawings and required for secondary framing. See Section 052100.
 - 10. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hexhead bolts; ASTM A 563 carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
 - a. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
 - 11. Structural Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563 heavy-hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

- a. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- 12. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts; ASTM A 563 heavy-hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.
- 13. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with spline ends.
 - a. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50, baked- epoxy coated.
- 14. Headed Anchor Rods: ASTM F 1554, Grade 36.
 - a. Configuration: Straight.
 - b. Nuts: ASTM A 563 heavy-hex carbon steel.
 - c. Plate Washers: ASTM A 36/A 36M carbon steel.
 - d. Washers: ASTM F 436 hardened carbon steel.
 - e. Finish: Hot-dip zinc coating, ASTM F 2329, Class C.
- 15. Threaded Rods: ASTM A 36/A 36M.
 - a. Nuts: ASTM A 563 heavy-hex carbon steel.
 - b. Washers: ASTM F 436 hardened carbon steel.
 - c. Finish: Plain.
- J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
 - 1. Clean and prepare in accordance with SSPC-SP2.
 - 2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.
 - a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 METAL ROOF PANELS

- A. Standing Seam Interlocking Roof Panels
 - 1. Standing-Seam, Vertical-Rib, Smooth Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
 - Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 22 gage uncoated steel thickness. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Exterior Finish: Two-coat fluoropolymer.
 - 2. Color: As selected by Architect from manufacturer's full range.
 - 3. Clips: Two-piece floating to accommodate thermal movement.

- 4. Joint Type: Mechanically seamed.
- 5. Panel Coverage: 18 inches minimum; 24 inches maximum.
- 6. Panel Height: 1-1/2 inches minimum.
- B. Exposed-Fastener, Tapered-Rib, Metal Liner Panels: Formed with raised, trapezoidal major ribs and flat pan between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
 - 1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.024-inch nominal uncoated steel thickness. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Exterior Finish: Siliconized polyester.
 - b. Color: White.
 - 2. Major-Rib Spacing: 12 inches o.c.
 - 3. Panel Coverage: 36 inches.
 - 4. Panel Height: 1.25 inches minimum.

2.6 FOAMED-INSULATION-CORE METAL WALL PANELS

- A. Concealed-Fastener, Foamed-Insulation-Core Metal Wall Panels: Formed with tongue-andgroove panel edges; designed for sequential installation by interlocking panel edges and mechanically attaching panels to supports using concealed clips or fasteners.
 - 1. Facing Material: Fabricate panel with exterior of zinc-coated (galvanized) or aluminumzinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness. Pre-painted by the coil-coating process to comply with ASTM A 755/A 755M.
 - a. Exterior Surface: Striated.
 - b. Color: As selected by Authority from manufacturer's full range.
 - 2. Panel Coverage: 36 inches to 48 inches nominal.
 - 3. Panel Thickness: Per manufacturer's standard to achieve required U-Value and R-Value.
 - 4. Insulation Core: Modified polyisocyanurate or polyurethane foam using a non-CFC blowing agent, foamed-in-place or board type, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively.
 - a. Closed-Cell Content: 90 percent when tested according to ASTM D 6226.
 - b. Density: 2.0 to 2.6 lb/cu. ft. when tested according to ASTM D 1622.
 - c. Compressive Strength: Minimum 20 psi when tested according to ASTM D 1621.
 - d. Shear Strength: 26 psi when tested according to ASTM C 273/C 273M.
 - 5. Fire-Test-Response Characteristics: Class A according to ASTM E 108.
 - 6. Surface-Burning Characteristics: Flame-spread index of 25 or less and a smokedeveloped index of 450 or less, per ASTM E 84.
- B. Finishes:

- 1. Exposed Coil-Coated Finish:
 - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.7 THERMAL INSULATION

- Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu.
 ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
- B. Retainer Strips: For securing insulation between supports, 0.025-inch (nominal-thickness, formed, metallic-coated steel or PVC retainer clips colored to match insulation facing.
- C. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm when tested according to ASTM E 96/E 96M, Desiccant Method.
 - 1. Composition: White polypropylene film facing and fiberglass-polyester-blend fabric backing.
- D. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- 2.8 PERSONNEL DOORS AND FRAMES
 - A. Swinging Personnel Doors and Frames: As specified in Section 081113 "Hollow Metal Doors and Frames."
- 2.9 WINDOWS
 - A. Vinyl Windows: As specified in Section 085313 "Vinyl Windows."
 - B. Glazing: Comply with requirements specified in Section 088000 "Glazing."
- 2.10 ACCESSORIES
 - A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
 - B. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

133419 - 12

- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
- D. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
- E. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
- F. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- G. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018inch nominal uncoated steel thickness, pre-painted with coil coating; finished to match adjacent metal panels.
- H. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
- I. Opening Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.030inch nominal uncoated steel thickness, pre-painted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

2.11 MATERIALS:

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
- B. Fasteners for Metal Panels: Manufacturer's system for in the seam concealed fastening.
- C. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
- D. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- E. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- F. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.
- G. Metal Panel Sealants:
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene- compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape of manufacturer's standard size.
 - 2. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.
- 2.12 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - 1. Make shop connections by welding or by using high-strength bolts.
 - 2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
 - 3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 - 4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
- D. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- E. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
- F. Make shop connections by welding or by using non-high-strength bolts.
- G. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- H. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
- I. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.

- 1. Engage land surveyor to perform surveying.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written instructions and drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with doublenutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level baseline elevation. Moist-cure grout for not less than seven days after placement.
 - 1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint

type specified.

- a. Joint Type: Snug tightened or pretensioned as required by manufacturer.
- G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
 - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 - 2. Locate and space wall girts to suit openings such as doors and windows.
 - 3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Bracing: Install bracing in roof and sidewall bays where indicated on erection drawings.
 - 1. Tighten rod and cable bracing to avoid sag.
 - 2. Locate interior end-bay bracing only where indicated.
 - 3. Interior diagonal bracing between frames and within the building footprint <u>IS NOT</u> <u>ALLOWED</u>. Portal frames shall be utilized as required for any required interior lateral bracing systems.
- I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional

demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
 - 1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.
- C. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

- 2. Install metal panels perpendicular to structural supports unless otherwise indicated.
- 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
- 4. Locate and space fastenings in uniform vertical and horizontal alignment.
- 5. Locate metal panel splices over structural supports with end laps in alignment.
- 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- D. Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress seam tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
 - 1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
- E. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- F. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
 - 1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 - 2. Shim or otherwise plumb substrates receiving metal wall panels.
 - 3. When two rows of metal panels are required, lap panels 4 inches minimum.
 - 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
 - 5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
 - 6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 - 7. Install screw fasteners in predrilled holes.
 - 8. Install flashing and trim as metal wall panel work proceeds.

- 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
- 10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
- 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

3.6 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
 - 1. Install ridge caps as metal roof panel work proceeds.
 - 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
 - 1. Install clips to supports with self-drilling or self-tapping fasteners.
 - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
 - 3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
 - 4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction.
 - 5. Provide metal closures at peaks, rake edges, rake walls, and each side of ridge caps.
- C. Metal Fascia Panels: Align bottom of metal panels and fasten with self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.
- D. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch (3- offset of adjoining faces and of alignment of matching profiles.

3.7 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 - 2. Shim or otherwise plumb substrates receiving metal wall panels.
 - 3. When two rows of metal panels are required, lap panels 4 inches minimum.

- 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
- 5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
- 6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
- 7. Install concealed screw fasteners in predrilled holes.
- 8. Install flashing and trim as metal wall panel work proceeds.
- 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
- 10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
- 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Insulated Metal Wall Panels: Install insulated metal wall panels on exterior side of girts. Attach panels to supports at each panel joint using concealed clip and fasteners at maximum 42 inches o.c., spaced not more than manufacturer's recommendation. Fully engage tongue and groove of adjacent insulated metal wall panels.
 - 1. Install clips to supports with self-tapping fasteners.
 - 2. Apply continuous ribbon of sealant to panel joint on concealed side of insulated metal wall panels as vapor seal; apply sealant to panel joint on exposed side of panels as weather seal.
- C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.8 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 - 2. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches

of

corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.
- B. Product will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.10 ADJUSTING

- A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.
- 3.11 CLEANING AND PROTECTION
 - A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.
 - B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
 - C. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
 - D. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.
 - 1. Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 133419