1. 13 34 19

**METAL BUILDING SYSTEMS**

**Note: This section must be reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings. Delete all “Notes” after editing.**

* 1. GENERAL
     1. SECTION INCLUDES
        1. Metal Framing Components
        2. Metal Wall Panels and Trim
        3. Metal Roof Panels and Trim
        4. Metal Building Accessories

Specifier: The standards referenced below are in general chosen to match those required by the latest version of the International Building Code. Review and edit as necessary to reflect the applicable building code for the project**.**

* + 1. RELATED SECTIONS
       1. Section 01 33 29 LEED™ Documentation.
       2. Section 03 15 00 - Placement of anchor bolt, leveling plates and grout.
       3. Section 03 30 00 - Cast-in-place concrete.
       4. Section 05 21 00 - Steel joist framing.
       5. Section 05 31 00 - Steel decking.
       6. Section 08 31 00 - Overhead doors.
       7. Section 08 50 00 - Windows.
       8. Section 08 60 00 - Skylights, Translucent Panels, Wall lights.
       9. Section 09 90 00 - Painting: Finish painting of primed steel surfaces.
    2. REFERENCE STANDARDS

Specifier: The standards referenced below are in general chosen to match those required by the latest version of the International Building Code. Review and edit as necessary to reflect the applicable building code for the project

* + - 1. American Institute of Steel Construction (AISC):
         1. 360, Specification for Structural Steel Buildings.
         2. RCSC, Specification for Structural Joints Using High Strength Bolts.
         3. Design Guide 3, Serviceability Design Considerations for Steel Buildings
      2. American Iron and Steel Institute (AISI):
         1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members
      3. American Welding Society (AWS):
         1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
         2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel
      4. Association for Iron & Steel Technology (AISE):
         1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
      5. ASTM International (ASTM):
         1. A36 – Standard Specification for Carbon Structural Steel
         2. A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
         3. A354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
         4. A475 – Specification for Zinc-Coated Steel Wire Strand
         5. A500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
         6. A529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
         7. A536 – Standard Specification for Ductile Iron Castings.
         8. A563 – Specification for Carbon and Alloy Steel Nuts
         9. A572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
         10. A653 / A653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
         11. A792 / A792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
         12. A992 – Standard Specification for Structural Steel Shapes.
         13. A1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
         14. A1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
         15. D2244–Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
         16. D4214 – Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films
         17. E96 / E96M – Standard Test Methods for Water Vapor Transmission of Materials.
         18. E108 - Spread-of Flame Testing: Class 1A Rating.
         19. E283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
         20. E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
         21. E1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
         22. E1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
         23. E1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
         24. E2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
         25. F436 – Specification for Hardened Steel Washers
         26. F1145 – Specification for Turnbuckles, Swaged, Welded, Forged
         27. F1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
         28. F3125 – Standard Specification for High Strength Structural Bolts
      6. CSA – Canadian Standards Association:

1. S16, Design of Steel Structures
   * + 1. CWB – Canadian Welding Bureau
       2. IAS – International Accreditation Service
       3. SJI – Steel Joist Institute
       4. Florida Product Approval:
          1. Product approved under file numbers,

FL704 - American Buildings

FL705 - American Buildings

FL47040 - American Buildings

FL47171 - American Buildings

FL4837 - Kirby Building Systems

FL4838 - Kirby Building Systems

FL38033 - Kirby Building Systems

FL47041 - Kirby Building Systems

FL47172 - Kirby Building Systems

FL2686 - Nucor Building Systems

FL4891 - Nucor Building Systems

FL30072 - Nucor Building Systems

FL47169 - Nucor Building Systems

FL16377 - Metl-Span

FL46681 - Metl-Span

* + - 1. FM Global:
         1. FMRC (Factory Mutual Research Corporation) Standard FM 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.
      2. Metal Building Manufacturers Association (MBMA):
         1. MBMA Metal Building Systems Manual
      3. Underwriters Laboratories (UL):
         1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies
         2. UL 790 – Standard Test Methods for Fire Tests of Roof Coverings
         3. UL 263 – Fire Tests of Building Construction and Materials
      4. Cool Roof Rating Council (CRRC):
         1. CRRC-1 Standard, 2008.
         2. Product Rating Program Manual for CRRC-1, October 2, 2024
    1. DEFINITIONS
       1. Metal Building System: A building system that will employ:  
          - Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed purlins or open-web steel joists for support of the roof cladding.  
          - Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed girts or open-web steel joists for support of the steel wall cladding.  
          - Three-plate, built-up rigid space frames and/or cold-formed ‘C’ or hot-rolled I-shaped post-and-beam framing to support the roof and wall secondary members.  
          - All systems (cladding, roof and wall secondary, lateral primary framing, and longitudinal bracing) work together to provide resistance to vertical and lateral loading demands.
       2. Gable Symmetrical: A continuous frame building with the ridge in the center of the building, consisting of tapered or straight columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (inset in the column line). The rafters may or may not have interior columns.
       3. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. The eave height and roof slope may differ on each side of the ridge. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
       4. Single-Slope: A continuous frame building which does not contain a ridge, but consists of one continuous slope from side to side. The building consists of straight or tapered columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
       5. Lean-To (LTO): A building extension, which does not contain a ridge, but consists of one continuous slope from side to side. These units usually have the same roof slope and girt design as the building to which they are attached and supported by.
       6. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.
       7. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).
       8. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.
       9. Building Length: Measured from outside to outside of endwall secondary structural member.
       10. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.
       11. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
       12. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.
       13. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.
       14. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
       15. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof, assumed to act on the horizontal projection of the roof.
       16. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.
       17. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.
    2. DESIGN REQUIREMENTS

**Note: Please fill in the information required for this project.**

* + - 1. General
         1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
         2. Design structural mill sections and built-up plate sections in accordance with:

(US) code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.

(Canada) CSA S16, “Design of Steel Structures”, latest edition.

* + - * 1. Cold-Formed steel structural members and panels will generally be designed in accordance with "Specifications for the Design of Cold-Formed Steel Structural Members", ANSI/AISI S-100.
        2. Design weldments per the following:

Structural Welding

(US) Design per AWS D1.1, “Structural Welding Code – Steel”, Latest Edition.

(Canada) Design per CWB W59, “Welded Steel Construction (Metal Arc Welding)”, Latest Edition.

Cold-Formed Welding

(US) Design per AWS D1.3, “Structural Welding Code – Sheet Steel”, Latest Edition.

(Canada) Design per CWB W59, “Welded Steel Construction (Metal Arc Welding)”, Latest Edition.

* + - 1. Design Code:
         1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:

Governing Building Code: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Year/Version: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Occupancy Category: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - 1. Design Loads:
         1. Risk Category of Building - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
         2. Dead Load – Weight of the building system as determined by manufacturer.
         3. Roof Live Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
         4. Collateral Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
         5. Snow Load:

Ground Snow Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Exposure Factor– \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Thermal Factor – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Roof Snow Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Wind Load:

Basic Wind Speed – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Exposure Category– \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Seismic Load:

Spectral response acceleration parameter at a period of 0.2 s (Ss) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Spectral response acceleration parameter at a period of 1-sec. (S1) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Site Class – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Floor Load.

Live Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Dead Load (Weight of Material by others)– \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Collateral Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents.
        2. Crane Loads:

Crane loads shall be a function of the Service Class as defined by the governing code and Crane Manufacturers Association of America (CMAA) and the rated tonnage (A- Standby or Infrequent service, B- Light service, C- Moderate service, D- Heavy Service, E- Severe Service, F- Continuous Severe Service).

Cranes in Service Class E or F shall be in accordance with AISE 13.

Service Class of Crane: \_\_\_\_\_\_\_\_\_\_\_\_.

Deflection Criterion for Crane: \_\_\_\_\_\_\_\_\_\_\_\_.

Crane loads will be obtained from the crane manufacturer and supplied by the Architect to the metal building system manufacturer at the time of bid.

Building structure shall be designed for the crane loads in accordance with the governing code.

Multiple cranes in the same bay or aisle shall be designed in accordance with the governing code.

If the governing code does not address multiple crane design practices, MBMA Metal Building Systems Manual shall be used.

**Note: Listed below are the General Serviceability Limits, please adjust if necessary.**

* + - 1. General Serviceability Limits:
         1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
         2. Vertical deflection limits apply for snow load (50-year mean-recurrence interval) plus collateral load, or the code required live load. The horizontal drift and deflections limits apply for the loads induced by a basic wind speed corresponding to a 10 year mean-recurrence interval.
    1. SUBMITTALS

**Note: Please delete all submittals that do not apply to this project**

* + - 1. Submit under provisions of Section 01 33 00.
      2. Product Data: Manufacturer's data sheets on each product to be used, including:
         1. Preparation instructions and recommendations.
         2. Storage and handling requirements and recommendations.
         3. Installation methods.
      3. Shop Drawings: Provide complete erection drawings for the proper identification and assembly of all building components. Drawings will show anchor bolt settings, transverse cross-sections, sidewall, endwall and roof framing, flashing, and sheeting, and accessory installation details.
      4. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
      5. Verification Samples: For each finish product specified, two samples, representing actual product, color, and patterns.
      6. Certifications: Shop drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by the manufacturer upon request.
      7. Bill of Materials: Bills of material shall be furnished and shall include item weights.
      8. Preventive Maintenance Manual.
      9. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.

**Note: Specify *any* of the following *three* sentences that apply to this project, delete any or all that do not apply. For Factory Mutual identify the proper classification.**

* + - 1. Submit certification verifying that the metal roof system has been tested and approved by Underwriter’s Laboratory as Class 90.
      2. Submit certification verifying that the metal roof system has been tested and approved by Factory Mutual as Class \_\_\_\_\_\_\_\_.
      3. Submit certification verifying that the metal standing seam roof system has been tested in accordance with ASTM E 1592 test protocols.

**Specifier: Retain following paragraph for LEED projects:**

* + - 1. LEED Submittals: Provide Documentation for the following:
         1. Credit SS 7.2 Heat Island Effect - Roof: Product data indicating compliance with solar reflectance index requirement.
         2. Credit MR 4 Recycled Content: Product data indicating the following:

Material costs for each product having recycled content.

Percentages by weight of post-consumer and pre-consumer recycled content for each item.

Total weight of products provided

* + 1. QUALITY ASSURANCE
       1. Manufacturer / Fabricator Qualifications:
          1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years’ experience.
          2. (Canada) All primary products specified in this section will be supplied by a single Manufacturer / Fabricator certified by the CAN/CSA A660-10, “Certification of Manufacturers of Steel Building Systems” program.
       2. Weldments/Welder/Weld Inspection Qualifications:
          1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, “Structural Welding Code – Steel”, latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, “Structural Welding Code – Sheet Steel”, latest edition.
          2. (Canada) The metal building manufacturer shall be certified per CWB W47.1, “Certification of Companies for Fusion Welding of Steel”, latest edition.
       3. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
       4. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by the manufacturer upon request.
    2. DELIVERY, STORAGE AND HANDLING
       1. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
       2. Storage and Handling Requirements:
          1. Store and handle materials in accordance with manufacturer’s instructions.
          2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
          3. Do not store materials directly on ground.
          4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
          5. Protect materials and finish during storage, handling, and installation to prevent damage.
       3. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside the manufacturer’s absolute limits.
       4. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
    3. WARRANTY
       1. Building System Warranty
          1. Furnish manufacturer’s standard warranty for the metal building system, excluding paint.
          2. The manufacturer shall warrant the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment.
          3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer’s plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
       2. Standing Seam Roof Weathertightness Warranty (Optional)
          1. Furnish manufacturer’s weathertightness warranty for a maximum of 20 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
       3. Roof and Wall Paint Finish Warranty
          1. Paint Systems

Furnish manufacturer’s standard warranty for the metal panel paint system against chipping, peeling, blistering, and fading.

Color fading exceeding Δ5 Hunter 'NBS' units, as defined by ASTM D2244, which utilizes the National Bureau of Standards (NBS) system for expressing color differences.

Chalking in excess of 8 units as set forth in ASTM D4214.

The warranty shall be for a period of 35 years from the date of shipment for 70% PVDF Cool Coating (polyvinylidene fluoride) paint systems.

The warranty shall be for a period of 25 years from the date of shipment for SP Cool Coating (silicone-modified polyester) paint systems.

* + - * 1. Galvalume® systems

Furnish manufacturer’s standard warranty for the Galvalume® panels against rupture, structural failure, or perforation due to normal atmospheric conditions.

The warranty shall be for a period of 20 years from the date of shipment for Galvalume® systems.

* 1. PRODUCTS
     1. MANUFACTURERS
        1. Acceptable Manufacturers:
           1. American Buildings; [http://www.americanbuildings.com](http://www.americanbuildings.com/)
           2. CBC Steel Buildings; [http://www.cbcsteelbuildings.com](http://www.cbcsteelbuildings.com/)
           3. Kirby Building Systems; [http://www.kirbybuildingsystems.com](http://www.kirbybuildingsystems.com/)
           4. Nucor Building Systems; [http://www.nucorbuildingsystems.com](http://www.nucorbuildingsystems.com/)
        2. Substitutions: Not permitted.
     2. MATERIALS
        1. Primary Framing Steel:
           1. Steel for hot rolled shapes must conform to the requirements of ASTM A36, A572 or A992, with minimum yield of 36 or 50 ksi, respectively.
           2. Steel for built-up sections must conform to the requirements of ASTM A1011, A1018, A529, A572 or A36 as applicable, with minimum yield of 36, 50, or 55 ksi as indicated by the design requirements.
           3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
           4. Square and Rectangular Tube must conform to the requirements of ASTM A500 Grade B with a minimum yield strength of 46 ksi.
           5. Steel for Cold-Formed sections must conform to the requirements of ASTM A1011 or A1039 Grade 55, or ASTM A653 Grade 55 with minimum yield strength of 55 ksi.
           6. X-bracing will conform to ASTM A529 for rod bracing, ASTM A992 for angle bracing or ASTM A475 for cable bracing.
        2. Secondary Framing Steel:
           1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A1011 or ASTM A1039 Grade 55 for primed material or ASTM A653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
           2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.
        3. Panels:
           1. Roll-formed Galvalume®, pre-painted Galvalume® or Galvanized G90 Exterior-Side and G60 Interior-Side. In Canada, Galvanized panel will have a coating thickness of G90 on both sides.
           2. Standing Seam Panels must have:

(For US and Export) 55 percent minimum aluminum-zinc alloy- coating and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.

(For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume® finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.

* + - * 1. Through-fastened panels must have:

(For US and Export) 55 percent minimum aluminum-zinc alloy coating and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.

(For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.

* + - * 1. Panel Finish:

SP Cool Coatings Finish: Silicone-Modified Polyester (SMP) standard paint system with a 25-year finish warranty.

PVDF Finish: 70% PVDF paint system with a 35-year finish warranty.

* + - 1. Panel Fasteners:
         1. For Galvalume® and Painted finished roof panels: Long Life Cast Zinc head.
         2. For wall panels: Coated carbon steel.
         3. The color of exposed fastener heads to match the wall and roof panel finish.
         4. Concealed Fasteners: Self-drilling type, of size required.
      2. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.
      3. Roof Clips:
         1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
         2. Short or Tall Fixed clips; shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height. Used for applications where only a moderate amount of thermal expansion and contraction in the roof panel is expected.
         3. Short or Tall Sliding clips: shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction, depending on clip choice.
         4. Super Tall Sliding clips: shall be 5 ½ inches (140mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction.
      4. Sealant And Closures:
         1. Sidelaps: Factory applied non-skinning Butyl mastic.
         2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
         3. Outside Closures: Closed-cell, plastic, or metal.
         4. Inside Closures: Closed-cell, plastic, or metal.
    1. PRIMARY FRAMING

**Note: Please specify the desired configurations for each category; delete all that do not apply.**

* + - 1. Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.
         1. Frame Design: Gable Symmetrical.
         2. Frame Design: Gable Unsymmetrical.
         3. Frame Design: Single Slope.
         4. Frame Design: Lean-To.
         5. Frame Type: Clear-Span.
         6. Frame Type: Multi-Span.
      2. Rigid Frame Columns:
         1. Straight/Uniform depth
         2. Tapered
      3. Rigid Frame Rafters:
         1. Straight/Uniform depth
         2. Tapered
      4. Endwall Frames / Roof Beams: Fabricated as mill-rolled sections or built-up "I" sections depending on design requirements. Fabricate endwall columns of cold-formed sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
      5. Interior Columns: Columns supporting rafters of mainframes shall be of the following cross-section type(s):
         1. Pipe (Round HSS).
         2. Tube (Square HSS).
         3. "I"-Shaped (Built-Up or Mill-Rolled depending on design requirements).
      6. Finish: Red-Oxide or Gray Primer, or galvanized (pre coated galvanized cold-form, hot-dipped otherwise).
      7. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM F3125 Grades A325 or A490 as required by design.
    1. SECONDARY FRAMING

**Note: Please specify the desired configurations (Depth and finish) of each type of secondary framing.**

* + - 1. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI S100. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will be installed through the purlin/girt webs, not purlin/girt flanges.
      2. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
         1. Depth: To be determined by design (8”, 9.5” or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      3. Girts: Horizontal structural members that support vertical panels.
         1. Depth: To be determined by design (8”, 9.5” or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      4. Eave Struts: Equal flange, cold-formed "C" sections or “Z” purlins.
         1. Depth: To be determined by design (8”, 9.5” or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      5. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
         1. Formed base sill
         2. Base channel

With flashing

Without flashing

* + - * 1. Base angle

With flashing

Without flashing

* + - * 1. Base girt

With flashing

Without flashing

* + - * 1. Finish: Red Oxide Primer
        2. Finish: Gray Primer
        3. Finish: Pre-Coated Galvanized
      1. Nucor Buildings Group Roof Joist system.
         1. Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
         2. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
         3. ClearBay® roof joist system with reduced bridging on qualified “Standing Seam” projects.
         4. Roof Joist Seat attachment

Fully Bolted (no welding required)

Welded

Alternate Bolt Option (some welding required)

* + - * 1. Roof Joist Bridging attachment

Fully Bolted (no welding required)

Welded

* + - * 1. Roof Joist Flange Brace attachment

Fully Bolted (no welding required)

Welded

**Note: Please specify the desired roof panel and applicable configurations (gauge, clip, and size/Thermal value). Delete roof panels that are not applicable.**

* + 1. ROOF PANELS
       1. Assembly Performance Requirements: Provide roof products and assemblies meeting the following requirements:

Coordinate these requirements with applicable national codes and standards. Roof radiative properties are particular to climate and standards and may not be required. UL and/or FM Global requirements may be needed for insurance purposes.

* + - * 1. UL 580, Class 90 assemblies approved and listed under manufacturer.
        2. Class A rated and listed in accordance with UL-790 for External Fire.
        3. Class 4 rated and listed in accordance with UL-2218A for Impact Resistance.
      1. FM Approvals Rating: Provide FM 4471 Approved assemblies based on the following ratings. All NBG single skin panels meet FM 4471 standards listed below. Identify materials with FM Approvals markings:

External Fire: Class A.

Internal Fire: Class 1.

Hail: Severe.

Specifier: Review and retain the following item for LEED projects pursuing credit SS 7.2 - Heat Island Effect. SRI may also be an energy code requirement.

Third-party listed and rated in a nationally recognized program in accordance with CRRC-1 with an [Initial] [3-year Aged] Solar Reflectance and [Initial] [3-year Aged] Thermal Emittance such that a minimum [Initial] [3-year Aged] Solar Reflectance Index (SRI) of \_\_\_ per ASTM E 1980 assuming medium wind conditions is provided.

* + - 1. R-Panel Roof Panel: A through-fastened roof with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning. Tested in accordance with ASTM E2140 water penetration and ASTM E1592 for wind uplift capacity.
         1. Gauge: 26 (Std.)
         2. Gauge: 24
         3. Gauge: 22
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish/Color: As specified in Article 2.8 PANEL FINISH
      2. CFR Roof Panel: A mechanically seamed trapezoidal standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E2140, E1646 and E1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
         1. Gauge: 24 (Std.)
         2. Gauge: 22
         3. Dimensions: 24 inches (610mm) wide by 3 inches (76mm) high
         4. Clips: Tall Fixed
         5. Clips: Short Fixed
         6. Clips: Tall Sliding
         7. Clips: Short Sliding
         8. Clips: Super Tall Sliding
         9. Finish/Color: As specified in Article 2.8 PANEL FINISH
      3. SSII Roof Panel: A mechanically seamed trapezoidal standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
         1. Gauge: 24 (Std.)
         2. Gauge: 22
         3. Dimensions: 24 inches (610mm) wide by 3 inches (76mm) high
         4. Clips: Tall Sliding
         5. Clips: Short Sliding
         6. Finish/Color: As specified in Article 2.8 PANEL FINISH
      4. SS360 Roof Panel: A mechanically seamed trapezoidal standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
         1. Gauge: 24 (Std.)
         2. Gauge: 22
         3. Dimensions: 24 inches (610mm) wide by 3 inches (76mm) high
         4. Clips: Tall Sliding
         5. Clips: Short Sliding
         6. Clips: Super Tall Sliding
         7. Finish/Color: As specified in Article 2.8 PANEL FINISH
      5. Loc Seam 90 / 360 Roof Panel: A mechanically seamed pan-type standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
         1. Gauge: 24(Std.)
         2. Gauge: 22
         3. Dimensions: 16 inches (406mm) wide by 2 inches (51mm) high
         4. Clips: Tall Fixed
         5. Clips: Short Fixed
         6. Clips: Tall Sliding
         7. Clips: Short Sliding
         8. Finish/Color: As specified in Article 2.8 PANEL FINISH
      6. Metl-Span CFR Insulated Roof Panel: A mechanically seamed vertical rib standing seam roof sandwich panel with concealed clips. Installed directly over purlin. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.

1. Exterior panel gauge: 24 (Std.)

2. Exterior panel gauge: 22

3. Interior panel gauge: 26 (Std.)

4. Interior panel gauge: 24

5. Interior panel gauge: 22

6. Size / Thermal Value: 36 inches (914mm) wide X 2 inches (50mm) thick (R-17.5)

7. Size / Thermal Value: 42 inches (1067mm) wide X 2 inches (50mm) thick (R-17.5)

8. Size / Thermal Value: 36 inches (914mm) wide X 2.5 inches (64mm) thick (R-21.9)

9. Size / Thermal Value: 42 inches (1067mm) wide X 2.5 inches (64mm) thick (R-21.9)

10. Size / Thermal Value: 36 inches (914mm) wide X 3 inches (76mm) thick (R-26.2)

11. Size / Thermal Value: 42 inches (1067mm) wide X 3 inches (76mm) thick (R-26.2)

12. Size / Thermal Value: 36 inches (914mm) wide X 4 inches (102mm) thick (R-35.0)

13. Size / Thermal Value: 42 inches (1067mm) wide X 4 inches (102mm) thick (R-35.0)

14. Size / Thermal Value: 36 inches (914mm) wide X 5 inches (127mm) thick (R-43.7)

15. Size / Thermal Value: 42 inches (1067mm) wide X 5 inches (127mm) thick (R-43.7)

16. Size / Thermal Value: 36 inches (914mm) wide X 6 inches (152mm) thick (R-52.5)

17. Size / Thermal Value: 42 inches (1067mm) wide X 6 inches (152mm) thick (R-52.5)

18. Color: As specified in Article 2.8 PANEL FINISHES

19. Standard Finish

a. Exterior: Embossed with Mesa Profile

b. Interior: Deep Embossed with Mesa Profile

c. Interior: Deep Unembossed with Mesa Profile

**Note: Please specify the desired wall panel and applicable configurations (gauge, and size/Thermal value). Delete wall panels that are not applicable.**

2.6 WALL PANELS

* + - 1. R-Panel Wall Panel: A through-fastened sidewall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
         1. Gauge: 26 (Std.)
         2. Gauge: 24
         3. Gauge: 22
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish/Color: As specified in Article 2.8 PANEL FINISH
      2. A-Panel Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.
         1. Gauge: 26 (Std.)
         2. Gauge: 24
         3. Gauge: 22
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish/Color: As specified in Article 2.8 PANEL FINISHES
      3. Reverse R-Panel Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.
         1. Gauge: 26 (Std.)
         2. Gauge: 24
         3. Gauge: 22
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish/Color: As specified in Article 2.8 PANEL FINISHES
      4. Metl-Span Flute Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         9. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         10. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         11. Size / Thermal Value: 42 inches (1061mm) by 5 inches (127mm) thick (R-43.7)
         12. Size / Thermal Value: 42 inches (1061mm) by 6 inches (152mm) thick (R-52.5)
         13. Size / Thermal Value: 42 inches (1061mm) by 8 inches (203mm) thick (R-70.0)
         14. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         15. Standard Finish

a. Exterior: Embossed with Flute Profile

b. Exterior: Unembossed with Flute Profile

c. Interior: Embossed with Mesa Profile (Std.) or Light Mesa Profile

d. Interior: Unembossed with Mesa Profile or Light Mesa Profile

* + - 1. Metl-Span Light Mesa Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         9. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
         10. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         11. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
         12. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         13. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
         14. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         15. Size / Thermal Value: 36 inches (914mm) by 5 inches (127mm) thick (R-43.7)
         16. Size / Thermal Value: 42 inches (1061mm) by 5 inches (127mm) thick (R-43.7)
         17. Size / Thermal Value: 36 inches (914mm) by 6 inches (152mm) thick (R-52.5)
         18. Size / Thermal Value: 42 inches (1061mm) by 6 inches (152mm) thick (R-52.5)
         19. Size / Thermal Value: 36 inches (914mm) by 8 inches (203mm) thick (R-70.0)
         20. Size / Thermal Value: 42 inches (1061mm) by 8 inches (203mm) thick (R-70.0)
         21. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         22. Standard Finish

a. Exterior: Embossed with Light Mesa Profile

b. Exterior: Unembossed with Light Mesa Profile

c. Interior: Embossed with Light Mesa Profile

d. Interior: Unembossed with Light Mesa Profile

* + - 1. Metl-Span Mesa Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         9. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
         10. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         11. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
         12. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         13. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
         14. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         15. Size / Thermal Value: 36 inches (914mm) by 5 inches (127mm) thick (R-43.7)
         16. Size / Thermal Value: 42 inches (1061mm) by 5 inches (127mm) thick (R-43.7)
         17. Size / Thermal Value: 36 inches (914mm) by 6 inches (152mm) thick (R-52.5)
         18. Size / Thermal Value: 42 inches (1061mm) by 6 inches (152mm) thick (R-52.5)
         19. Size / Thermal Value: 36 inches (914mm) by 8 inches (203mm) thick (R-70.0)
         20. Size / Thermal Value: 42 inches (1061mm) by 8 inches (203mm) thick (R-70.0)
         21. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         22. Standard Finish

a. Exterior: Embossed with Mesa Profile

b. Exterior: Unembossed with Mesa Profile

c. Interior: Embossed with Mesa Profile or Light Mesa Profile

d. Interior: Unembossed with Mesa Profile or Light Mesa Profile

* + - 1. Metl-Span Santa Fe Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 24 (Std.)
         2. Exterior panel gauge: 22
         3. Interior panel gauge: 26 (Std.)
         4. Interior panel gauge: 24
         5. Interior panel gauge: 22
         6. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
         7. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
         9. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         10. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
         11. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         12. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
         13. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         14. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         15. Standard Finish

a. Exterior: Heavy Embossed with Santa Fe Profile

b. Interior: Embossed with Light Mesa Profile

c. Interior: Unembossed with Light Mesa Profile

* + - 1. Metl-Span Striated Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 24 (Std.)
         2. Exterior panel gauge: 22
         3. Interior panel gauge: 26 (Std.)
         4. Interior panel gauge: 24
         5. Interior panel gauge: 22
         6. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
         7. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
         9. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         10. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
         11. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         12. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
         13. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         14. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         15. Standard Finish
  1. Exterior: Deep Embossed with Striated Profile
  2. Exterior: Unembossed with Striated Profile
  3. Interior: Embossed with Light Mesa Profile
  4. Interior: Unembossed with Light Mesa Profile
     + 1. Metl-Span Tuff-Cast Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
          1. Exterior panel gauge: 24 (Std.)
          2. Exterior panel gauge: 22
          3. Interior panel gauge: 26 (Std.)
          4. Interior panel gauge: 24
          5. Interior panel gauge: 22
          6. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
          7. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
          8. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
          9. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
          10. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
          11. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
          12. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
          13. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
          14. Size / Thermal Value: 36 inches (914mm) by 5 inches (127mm) thick (R-43.7)
          15. Size / Thermal Value: 42 inches (1061mm) by 5 inches (127mm) thick (R-43.7)
          16. Size / Thermal Value: 36 inches (914mm) by 6 inches (152mm) thick (R-52.5)
          17. Size / Thermal Value: 42 inches (1061mm) by 6 inches (152mm) thick (R-52.5)
          18. Finish/Color: As specified in Article 2.8 PANEL FINISHES
          19. Standard Finish

Exterior: Factory Applied Tuff-Cast Texture Profile

Interior: Embossed with Light Mesa Profile

Interior: Unembossed with Light Mesa Profile

* + - 1. Metl-Span Tuff Wall Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
         1. Exterior panel gauge: 24 (Std.)
         2. Exterior panel gauge: 22
         3. Interior panel gauge: 26 (Std.)
         4. Interior panel gauge: 24
         5. Interior panel gauge: 22
         6. Size / Thermal Value: 36 inches (914mm) by 2 inches (51mm) thick (R-17.5)
         7. Size / Thermal Value: 42 inches (1061mm) by 2 inches (51mm) thick (R-17.5)
         8. Size / Thermal Value: 36 inches (914mm) by 2.5 inches (64mm) thick (R-21.9)
         9. Size / Thermal Value: 42 inches (1061mm) by 2.5 inches (64mm) thick (R-21.9)
         10. Size / Thermal Value: 36 inches (914mm) by 3 inches (76mm) thick (R-26.2)
         11. Size / Thermal Value: 42 inches (1061mm) by 3 inches (76mm) thick (R-26.2)
         12. Size / Thermal Value: 36 inches (914mm) by 4 inches (102mm) thick (R-35.0)
         13. Size / Thermal Value: 42 inches (1061mm) by 4 inches (102mm) thick (R-35.0)
         14. Size / Thermal Value: 36 inches (914mm) by 5 inches (127mm) thick (R-43.7)
         15. Size / Thermal Value: 42 inches (1061mm) by 5 inches (127mm) thick (R-43.7)
         16. Size / Thermal Value: 36 inches (914mm) by 6 inches (152mm) thick (R-52.5)
         17. Size / Thermal Value: 42 inches (1061mm) by 6 inches (152mm) thick (R-52.5)
         18. Finish/Color: As specified in Article 2.8 PANEL FINISHES
         19. Standard Finish

a. Exterior: Factory Applied Tuff Wall Texture Profile

b. Interior: Embossed with Light Mesa Profile

**Note: Please specify the applicable accessories to be used on this project. Delete all that do not apply.**

2.7 ACCESSORIES

* + - 1. Canopies: Overhanging or projecting roof structures off the sidewall or endwall with the extreme end usually unsupported. For aesthetic application or to cover entrance or walkway.
      2. Roof Line Trim:
         1. Basic Sculptured Trim Type: Low-Eave Gutter (on slope or horizontal) / Sculptured Rake Trim
      3. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.
      4. Framed Openings: Used to frame out: doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.
      5. Walk Doors: Personnel entry doors.
         1. Size: As noted on the Contract Drawings.
         2. Accessories: As noted on the Contract Drawings
         3. Size: 3 foot by 7 foot (914x2133mm) Single Leaf
         4. Size: 4 foot by 7 foot (1219x2133mm) Single Leaf
         5. Size: 6 foot by 7 foot (1828x2133mm) Double Leaf
      6. Premium Windows: Self-flashing, self-framing horizontal slide, project in or fixed narrow-lite windows.
         1. Type / Size: As noted on the Contract Drawings.
         2. Type: Fixed Glass

Size: 2 foot by 6 foot (610x1828mm)

Size: 4 foot by 4 foot (1219x1219mm)

Size: 5 foot by 4 foot (1524x1219mm)

* + - * 1. Type: Horizontal Slide

Size: 3 foot by 3 foot (914x914mm)

Size: 4 foot by 3 foot (1219x914mm)

Size: 4 foot by 4 foot (1219x1219mm)

Size: 6 foot by 3 foot (1828x914mm)

* + - * 1. Type: Project In

Size: 3 foot by 4 foot (914x1219mm)

* + - 1. Economy Windows: Self-flashing, Frameless horizontal slide windows.
         1. Type / Size: As noted on the Contract Drawings.
         2. Type: Horizontal Slide

Size: 3 foot by 3 foot (914x914mm)

Size: 4 foot by 3 foot (1219x914mm)

Size: 4 foot by 4 foot (1219x1219mm)

Size: 6 foot by 3 foot (1828x914mm)

* + - 1. Premium IMP Windows: Self-flashing, Frameless horizontal slide IMP windows.
         1. Type / Size: As noted on the Contract Drawings.
         2. Type: Horizontal Slide

Size: 3 foot by 3 foot (914x914mm)

Size: 4 foot by 4.5 foot (1219x1372mm)

Size: 6 foot by 3 foot (1828x914mm)

* + - 1. Daylighting with Prismatic Skylights:
         1. Curb Mounted Prismatic Skylights
         2. Curb Mounted Smoke & Heat Vent Skylights
      2. Translucent Roof and Wall Panels: Translucent Acrylit™ panels consisting of 8 oz. 100% acrylic translucent panel woven roving strand combined with chopped strand matrix fiberglass reinforcement. White in color with a minimum of 55-60 percent light transmittance. U/L 90 rated panel available. Allows natural light into the building.
      3. Liner Panels: R-Panel Liner Panel: A through-fastened sidewall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
         1. Gauge: 28 (Std.)
         2. Gauge: 26
         3. Gauge: 24
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish: As specified in Article 2.8 PANEL FINISHES
      4. Soffit Panels:
         1. R-Panel: A through-fastened panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs are reinforced to minimize oil-canning.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - * 1. A-Panel: Reverse-rolled panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - * 1. Reverse R-Panel: Reverse-rolled panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - * 1. Flat SL Panel: Flush, lock-joint profile with raised flat pan with concealed fasteners.

Gauge: 24 (std.)

Dimensions: 12 inches (305mm) wide by 1 1/2 inch (38mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - 1. Facades: Decorative structural and panel system projecting from the face of a wall panel.
      2. Parapet Walls: Wall panels below the roof line that extend above the roof line to a given elevation. Parapet walls include 14 gauge pre-galvanized parapet gutter (gutter liner and drainage members by others) when located on a sidewall (except at the high side of a Single-Slope or Lean-to building).
      3. Partitions: Interior or exterior walls that are inside the building footprint to section off parts of the interior space of a building.
      4. Valley Gutter: Gutter used to carry off water from attached buildings or multi-gabled buildings. Standard valley gutter is 14 gauge pre-galvanized 10 foot (3048mm) sections, field welded in place (gutter liner and drainage members by others).
      5. Roof Curbs: Welded units fabricated for Metal Roof application. Minimum 18 gauge Galvalume™ coated steel, with welds cleaned and treated with protective coating compatible with the Galvalume™ substrate. Minimum curb height shall be 8”.
         1. Top of curb to be level with ground, with 1 ½” top flange.
         2. Curb walls insulated with 1 ½”-3lb.density fiberglass insulation.
         3. Welded integral cricket on upslope side of curb to divert water.
         4. Metal or plastic rib covers supplied loose for flexibility when installing curb.
         5. Standard sub-frame shall be minimum 16 gauge steel.
         6. All fasteners and sealants required for installation shall be furnished by Roof Curb manufacturer.
      6. Roof Vents: Accessories used on the roof to allow air to pass through.
         1. Gravity Ridge Vents: Can be used as single unit or continuous.

Size: 9 inch by 10 foot (229x3048mm) with Damper & Lockerpull.

Size: 12 inch by 10 foot (305x3048mm) with Damper & Lockerpull.

* + - 1. Pipe Flashings: Pipe flashing shall be of a one-piece construction and fabricated from an EPDM membrane and shall have an aluminum base that can be field conformed to any panel configuration. Pipe flashings shall be flexible for mounting on any roof slope. Service temperature ranges shall be from -30°F to +250°F. Three standard flashing sizes shall accommodate pipe sizes from 1/4” diameter up to 13” diameter.
         1. Size: ¼” to 4” (6 to 102mm) Pipe
         2. Size: 4” to 7” (102 to 178mm) Pipe
         3. Size: 7” to 13” (178 to 330mm) Pipe

**Note: Please specify the desired panel finish for each type of panel. Delete all that do not apply.**

* 1. PANEL FINISHES
     + 1. Roof Panel:
          1. Galvalume® (GM)
          2. Standard Panel Paint System (Silicone-Modified Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + - 1. Wall Panel:
         1. Standard Panel Paint System (Silicone-Modified Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + - 1. Insulated Roof panel:
         1. Exterior panel:

PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Pearl Gray (PG)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Surrey Beige (SU)

Color: Warm White (WW)

Color: Slate Gray (SG)

* + - * 1. Interior panel:

Standard Panel Paint System (Polyester Resin)

Color: Igloo White (IG)

* + - 1. Insulated Wall panel:
         1. Exterior panel:

PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Pearl Gray (PG)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Surrey Beige (SU)

Color: Warm White (WW)

Color: Slate Gray (SG)

* + - * 1. Interior panel:

Standard Panel Paint System (Polyester Resin)

Color: Igloo White (IG)

* + - 1. Liner Panel:
         1. Standard Panel Paint System (Silicone-Modified Polyester Resin, 25-year Finish Warranty):

28 gauge:

Color: Polar White (PW)

26 & 24 gauge:

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - 1. Soffit Panel (R-Panel, A-Panel, Reverse R-Panel):
         1. Standard Panel Paint System (Silicone-Modified Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + - 1. Soffit Panel (Flat SL Panel):
         1. PVDF Panel Paint System (PVDF Resin, 35-year Finish Warranty):

Color: Desert Sand (DS)

Color: Regal White (RW)

Color: Slate Gray (SG)

2.9 FABRICATION

* + - 1. General:
         1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
         2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
         3. All framing members must carry an identifying mark.
      2. Primary Framing:
         1. Plates, Stiffeners and Related Members: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
         2. Bolt Holes and Related Machining: Shop fabricated base plates, splices, and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
         3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
         4. The manufacturer is responsible for all shop welding inspections in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
         5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.
      3. Open-Web Roof Joists:
         1. Secondary framing for ‘long-bay’ building layouts shall consist of open-web bar joists designed under Steel Joist Institute (SJI) specifications by an SJI-Certified Joist Manufacturer for the prescribed loads.
      4. Zee Purlins:
         1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.
      5. Girts
         1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.
      6. Bracing:
         1. Diagonal Bracing:

Longitudinal bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind or seismic forces. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.

Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded at each end or galvanized cable with suitable threaded end anchors. If load requirements dictate, bracing may be of structural angle and/or tube, bolted in place.

* + - * 1. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column may be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
        2. Flange Braces: The inside compression flange of all primary framing must be braced laterally with angles connecting to the bottom chords of joists or to the webs of purlins/girts so that the flange compressive stress is within allowable limits for any combination of loading.
        3. Bridging: Laterally bridge the top and bottom chords of the open-web bar joists as required by design thereof and specified on the building erection drawings.
      1. Trapezoidal Standing Seam Panels - General:
         1. One side of the panel is configured as female, having factory applied mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.
         2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
         3. Maximum panel length is 50 feet (16,764mm) unless otherwise noted in the Contract Documents.
         4. Endlaps:

Endlaps must have a 16 gauge backup plate and have the (8) endlap joint fasteners installed in dimpled locations in the flat with (1) endlap joint fastener installed in each trapezoid shoulder for a total of (10) fasteners at each endlap.

Apply mastic between the panels and secured with #1/4-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.

"Through-the-Roof" fasteners may only be used at endlaps and eaves.

* + - 1. Vertical Rib Standing Seam Panels - General:
         1. One side of the panel is configured as female, having factory applied mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.
         2. Panels are factory swaged when endlaps are required. Panels cannot start at both ends of the building and work towards each other.
         3. Maximum panel length is 50 feet (16,764mm) unless otherwise noted in the Contract Documents.
         4. Endlaps:

Endlaps must have a 16 gauge backup plate and have the (5) endlap joint fasteners installed in dimpled locations in the flat at each endlap.

Apply mastic between the panels and secured with #1/4-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.

"Through-the-Roof" fasteners may only be used at endlaps and eaves.

**PART 3 EXECUTION**

3.1 EXAMINATION

* + - 1. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
      2. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment’s to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer’s tolerances.
      3. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

* + - 1. Clean surfaces thoroughly prior to installation.
      2. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction 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 INSTALLATION

* + - 1. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
      2. Erect framing in accordance with *MBMA Metal Building Systems Manual, Chapter IV Common Industry Practices*
      3. There shall be no field modifications to primary structural members except as authorized and specified by the manufacturer.

3.4 PROTECTION

* + - 1. Protect installed products until completion of project.
      2. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**