

STANDARD SPECIFICATIONS FOR
MID-WEST STEEL BUILDING COMPANY
These specifications subject to change without notice.

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SECTION 1. GENERAL

1.1. Scope

- 1.1.1. These specifications cover the materials and the fabrication of metal buildings designed, fabricated, and readily erected to be weather tight.
- 1.1.2. These specifications are an outline of performance to ensure that the architect, engineer, builder and/or owner understands the basis for design, manufacture and application of the entire manufacturer's metal building system.
- 1.1.3. Because of a continuing program of research and development, specifications in this manual are subject to change without notice.

1.2. Building Description

- 1.2.1. A "Traditional Metal Building System" is defined as a building system that will use either continuous or simple span "Z" purlins for support of the roof covering material.
- 1.2.2. A "Long Bay System" (LBS) is defined as a building system that will use simple span, cold formed, open web purlins to support the roof covering material.
- 1.2.3. Gable Symmetrical is 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 (flush in the column line). The rafters may or may not have interior columns.
- 1.2.4. Gable Unsymmetrical is 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.
- 1.2.5. Single Slope is 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.
- 1.2.6. Lean-to (LT) is 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.
- 1.2.7. All building types normally have simple span endwall girts flush in the column line.

1.3. Building Nomenclature

- 1.3.1. Roof slope is expressed as inches of rise for each 12" of horizontal run.
- 1.3.2. Building "Width" is measured from outside to outside of sidewall secondary structural member (girt).
- 1.3.3. Building "Eave Height" is a nominal dimension measured from the finished floor to top flange of eave strut.

- 1.3.4. Building "Length" is measured from outside to outside of endwall secondary structural member.

1.4. Drawings and Certifications

- 1.4.1. Drawings: Manufacturer shall furnish complete erection drawings for the proper identification and assembly of all building components. These drawings will show anchor bolt settings, transverse cross-sections, sidewall, endwall and roof framing, flashing and sheeting, and accessory installation details.
- 1.4.2. Certifications: Standard drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by manufacturer upon request.
- 1.4.3. Bills of material shall be furnished and shall include item weights, if requested.

SECTION 2. STRUCTURAL STEEL DESIGN

2.1. General

- 2.1.1. The building manufacturer shall use standards, specifications, recommendations, findings and/or interpretations of professionally recognized groups such as AISC, AISI, AAMA, AWS, ASTM, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. For convenience, one or more sources may be referenced in a particular portion of these specifications. In all instances, however, the manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents. All materials shall be designed and fabricated by an AISC - MB category certified manufacturer.
- 2.1.2. Structural mill sections or welded up plate sections will generally be designed in accordance with the 9th edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ASD method.
- 2.1.3. Cold-Formed steel structural members will generally be designed in accordance with the latest edition of AISI's "Specifications for the Design of Cold-Formed Steel Structural Members".

2.2. Design Loads

- 2.2.1. Design loads shall be as specified and set forth in the contract, and shall be in accordance with the manufacturer's standard design practices. Design loads may include dead load, roof live loads, wind loads, seismic loads, collateral loads, auxiliary equipment loads, and/or other applied or specified loads.
- 2.2.2. Dead Load - the actual weight of the building system supported by a given member.
- 2.2.3. 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.
- 2.2.4. 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.
- 2.2.5. Wind Loads - the loads on a structure induced by the forces of wind blowing from any horizontal direction.
- 2.2.6. Collateral Loads - the weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
- 2.2.7. Auxiliary Loads - dynamic loads induced by cranes, conveyors, or other material handling systems.
- 2.2.8. Seismic Loads - Loads acting in any direction on a structural system due to the action of an earthquake.
- 2.2.9. Floor Live Loads - loads induced on a floor system by occupants of a building and their furniture, equipment, etc.

SECTION 3. TRADITIONAL METAL BUILDING SYSTEM BASIC MATERIAL SPECIFICATIONS

3.1. Primary Framing Steel

- 3.1.1. Steel for hot rolled shapes shall conform to the requirements of ASTM Specifications A-36 or A992, with minimum yield of 36 or 50 ksi.
- 3.1.2. Steel for built-up sections shall generally conform to the physical requirements of ASTM A1011, A529, A572 or A36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
- 3.1.3. Steel for endwall "C" sections shall generally conform to the physical requirements of ASTM A1011 Grade 55. Minimum yield shall be 57 ksi.

3.2. Secondary Framing Steel

- 3.2.1. Steel used to form purlins, girts, and eave struts shall meet the requirements of ASTM A1011 Grade 55. Minimum yield shall be 57 ksi.

3.3. Roof And Wall Panel Material

- 3.3.1. Panel material as specified shall be 26 gauge or 24 gauge acrylic coated Galvalume® or pre-painted Galvalume® as manufactured by Bethlehem Steel Corporation, or equal, conforming to the requirements of ASTM A792 Grade 80 or Grade 50. Minimum yield stress shall be 80 ksi for Grade 80 and 50 ksi for Grade 50.
- 3.3.2. See Section 5 for additional material used.

3.4. Structural Framing

- 3.4.1. All framing members shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs or distortions.
- 3.4.2. All shop connections shall be in accordance with the manufacturer's standard design practices as specified in Paragraph 2.1.1. Certification of welder qualifications will be furnished when required and specified in advance.
- 3.4.3. All framing members, where necessary, shall carry an identifying mark.

3.5. Primary Framing

- 3.5.1. Rigid Frame: All rigid frames shall be welded built-up "I" sections or hot-rolled sections. The columns and the rafters may be either uniform depth or tapered. Flanges shall be connected to webs by means of a continuous fillet weld on one side.
- 3.5.2. Endwall Frames: All endwall roof beams and endwall columns shall be cold-formed "C" sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
- 3.5.3. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.
- 3.5.4. Bolt Holes, etc.: All base plates, splice and flanges shall be shop fabricated to include bolt connection holes. Webs shall be shop fabricated to include bracing holes.
- 3.5.5. Connections for secondary structural (purlins and girts) shall be ordinary bolted connections, which may include welded clips.
- 3.5.6. All welding inspection shall be by the manufacturer in accordance with the manufacturer's AISC – MB category certification. Special inspection by the buyer or owner shall be done in the manufacturer's facility and shall be noted on the contract documents.

3.6. Secondary Framing

- 3.6.1. 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. Purlin and girt flanges shall be unequal in width to allow for easier nesting during erection. 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 install through the purlin webs, not purlin flanges.

- 3.6.2. Eave Struts: Eave Struts shall be unequal flange cold-formed "C" sections.

- 3.6.3. Base Angle: A base member will be supplied by which the base of the wall covering may be attached to the perimeter of the slab. This member shall be secured to the concrete slab with ram-sets, expansion bolts, or equivalent anchors as shown on the drawings.

3.7. Bracing

- 3.7.1. Diagonal Bracing: Diagonal bracing in the roof and sidewalls shall be used to resist longitudinal loads (wind, crane, seismic, etc.) in the structure. This bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.
- 3.7.2. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the webs of purlins or girts so that the flange compressive stress is within allowable limits for any combination of loading.
- 3.7.3. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base columns will be used. Wind 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 forces.

3.8. Roof and Wall Covering

- 3.8.1. Roof panels shall be "PBR" or standing seam. "PBR" panels shall have an extended purlin bearing leg. For standing seam see Sections 5.2 and 5.3.
- 3.8.2. Wall panels may be any of the following: "PBR", "U", "A", "AM", all of which shall have an extended bearing leg, or "ShadowRib®", or "NuWall®" profile. Panel profiles "A", "AM", "ShadowRib®", and "NuWall®" are considered Architectural panels.

SECTION 4. LONG BAY SYSTEM BASIC MATERIAL SPECIFICATIONS

4.1. Primary Framing Steel

- 4.1.1. Steel for hot rolled shapes shall conform to the requirements of ASTM Specifications A-36 or A992, with minimum yield of 36 or 50 ksi.
- 4.1.2. Steel for built-up sections shall generally conform to the physical requirements of ASTM 1011, A529, A572 or A36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
- 4.1.3. Steel for endwall "C" sections shall generally conform to the physical requirements of ASTM 1011 Grade 55, and have a minimum yield of 57 ksi.

4.2. Secondary Framing Steel

- 4.2.1. Steel used to form purlins, girts, and eave struts shall meet the requirements of ASTM 1011 Grade 55. Minimum yield shall be 57 ksi.

4.3. Roof And Wall Panel Material

- 4.3.1. Panel material as specified shall be 26 gauge or 24 gauge acrylic coated Galvalume® or pre-painted Galvalume® as manufactured by Bethlehem Steel Corporation, or equal, conforming to the requirements of ASTM A792 Grade 80 or Grade 50. Minimum yield stress shall be 80 ksi for Grade 80 and 50 ksi for Grade 50.
- 4.3.2. See Section 5 for additional material used.

4.4. Structural Framing

- 4.4.1. All framing members shall be shop fabricated for field bolted assembly. The surfaces of the bolted connections shall be smooth and free from burrs or distortions.
- 4.4.2. All shop connections shall be in accordance with the manufacturer's standard design practices as specified in Paragraph 2.1.1. Certification of welder qualifications will be furnished when required and specified in advance.

- 4.4.3. All framing members, where necessary, shall carry an identifying mark.
- 4.5. Primary Framing**
- 4.5.1. Rigid Frame: All rigid frames shall be welded built-up "I" sections or hot-rolled sections. The columns and the rafters may be either uniform depth or tapered. Flanges shall be connected to webs by means of a continuous fillet weld on one side.
- 4.5.2. Endwall Frames: All endwall roof beams shall be mill-rolled sections, or built-up "I" sections depending on design requirements. All endwall columns shall be cold-formed "C" sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
- 4.5.3. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.
- 4.5.4. Bolt Holes, etc.: All base plates, splice and flanges shall be shop fabricated to include bolt connection holes. Webs shall be shop fabricated to include bracing holes.
- 4.5.5. Connections for secondary structural (purlins and girts) shall be ordinary bolted connections, which may include welded clips.
- 4.5.6. All welding inspection shall be by the manufacturer in accordance with the manufacturer's AISC – MB category certification. Special inspection by the buyer or owner shall be done in the manufacturer's facility and shall be noted on the contract documents.
- 4.6. Secondary Framing**
- 4.6.1. Purlins and Girts: Purlins shall be cold-formed open web Long Bay System assemblies (LBS) with stiffened chords. Purlins shall be simple span and connection bolts will install through the purlin seats. LBS assemblies shall be pre-punched to allow for attachment of frame flange brace angles, compression strut extensions and diagonal X-bridging at the centerline. All other bridging shall be furnished as light-gage cold-formed angles and shall be secured using self-drilling fasteners. All LBS sections shall be manufactured in a facility that holds a current, valid MB Quality Certificate issued by the American Institute of Steel Construction. The top and bottom chords of all LBS sections shall have a nominal width of 4" and shall be formed so that the top surface is continuous and flat to facilitate easy assembly of the chosen roof system. All elements of the LBS assembly shall be a minimum of 16 gauge. The finished assemblies shall be subject to periodic testing to loads equal to 110% of the design loads to ensure proper assembly processes. 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. Girt flanges shall be unequal in width to allow for easier nesting during erection. They shall be prepunched at the factory to provide for field bolting to the rigid frames. Girts shall be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.
- 4.6.2. Eave Struts: Eave Struts shall be unequal flange cold-formed "C" sections or LBS purlins.
- 4.6.3. Base Angle: A base member will be supplied by which the base of the wall covering may be attached to the perimeter of the slab. This member shall be secured to the concrete slab with ram-sets, expansion bolts, or equivalent anchors as shown on the drawings.
- 4.7. Bracing**
- 4.7.1. Diagonal Bracing: Wind 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 shall be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used. This bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.
- 4.7.2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base columns will be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
- 4.7.3. Flange Braces: The compression flange of all primary framing shall be braced laterally with angles connecting to the bottoms chords of purlins or to the webs of girts so that the flange compressive stress is within allowable limits for any combination of loading.
- 4.7.4. Bridging: The top chord of the LBS purlins shall be braced laterally with horizontal bridging if the roof system being used will not supply adequate lateral support to the top chord. The bottom chord will receive horizontal bridging to laterally brace the bottom chord. One row of bolted diagonal bridging will be required for all LBS purlins 40 ft. long and greater.
- 4.8. Roof and Wall Covering Roof**
- 4.8.1. Roof panels shall be any of the following: "B Deck" or Double-Lok® standing seam. For standing seam see Section 5.2 & 5.3.
- 4.8.2. Wall panels may be any of the following: "PBR", "U", "A", "AM", all of which shall have an extended bearing leg, or "ShadowRib®", or "NuWall®" profile. Panel profiles "A", "AM", "ShadowRib®", and "NuWall®" are considered Architectural panels.

SECTION 5. ROOF AND WALL COVERING

5.1. General.

- 5.1.1. Standing Seam Roof Panels - see Section 5.2 and 5.3.
- 5.1.2. "PBR" Panel shall have major ribs 1 1/4" high spaced 12" on center. In the flat area between the major ribs are two smaller minor ribs. Each panel shall provide 36" net coverage in width. All sidelaps shall be at least one major rib.
- 5.1.3. "PBU" wall panel shall have ribs 3/4" high spaced 6" on center. Each panel shall provide 36" net coverage in width. All sidelaps shall be at least one rib.
- 5.1.4. Architectural ("A" or "AM") wall panel shall have a configuration consisting of ribs 1 1/8" or 1 3/16" deep. Major corrugations shall be spaced 12" on center. Panel design produces a decorative smooth shadow line with semi-concealed fasteners. Architectural panels shall provide a 36" net coverage in width. All sidelaps shall be at least one major rib.
- 5.1.5. Architectural ShadowRib® wall panel shall have a configuration consisting of a 5 1/4" flat area with a 1 1/2" deep indentation in the middle of the panel. The panel coverage is to be 16", with a panel depth of 3".
- 5.1.6. Architectural "NuWall®" Panel shall be 2 1/2" deep x 12" wide with 1/2" deep fluting with concealed fasteners.
- 5.1.7. "Retro R®" (Retro-Fit) panels shall have major ribs 1" high at 12" centers. Each panel shall provide 36" net coverage in width. All sidelaps shall be at least one major rib. This panel is designed to go over existing "R" panel roofs. The existing roof panels do not have to be removed. Existing roof panels must be inspected for structural integrity. All rusted or damaged areas must be removed and replaced.
- 5.1.8. "Artisan® 1" Liner/Soffit Panel shall be flat, 1" high and provide 12" net coverage width. Panels shall be interlocking and be fastened with a concealed fastener. Panels are also available with two stiffening ribs.
- 5.1.9. Panel Length: All wall panels shall be continuous from sill to roof line and all roof panels shall be continuous from eave to ridge except where lengths become prohibitive for handling purposes. All end laps shall be at least 6" on roof and 4" on walls.
- 5.1.10. Endwall Edge Cuts: All endwall panels for buildings with 1:12 or less roof slope shall be square cut. All endwall panels for buildings with more than 1:12 roof slope shall be bevel cut by the erector in the field.

5.2. Standing Seam Roof

Panel Type - Ultra-Dek® (Snap Lock) or Double-Lok® (Machine Seamed)

- 5.2.1. Standing Seam Roof Panels shall be UL-90 rated, roll-formed, 24 or 22 gauge acrylic coated Galvalume® or pre-painted Galvalume®. Galvalume® sheet shall have 50% aluminum-zinc alloy-coating with a minimum yield of 50 ksi and conform to ASTM 792-99a. Pre-painted finish shall be a premium Fluoropon® coating produced with either Kynar 500® or Hylar 5000® resins and have a full 20 year warranty. Wherever used in this specification, acrylic-coated Galvalume® means Galvalume® with a light acrylic coating such as Galvalume Plus by Bethlehem, Acrylume by National or Galvalume Plus by U.S. Steel. This coating eliminates the need for roll-forming oil and reduces the incidence of field marking by handling or foot traffic.
- 5.2.2. Panels shall be 24" or 18" wide with 2 minor ribs in between seams. Panel seam shall be 3" high.
- 5.2.3. One side of the panel shall be female in configuration, which will have factory applied hot-melt mastic (see Sealants And Closures) inside the female seam. The female side will snap over the male side. When using Ultra-Dek® Standing Seam, this procedure will form a self-locking snap system. If choosing Double-Lok® Standing Seam, the male and female seams will be continuously locked together by an electrically powered mechanical seamer, forming a 360-degree Pittsburgh Seam.
- 5.2.4. The panels shall be 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.
- 5.2.5. Maximum panel length shall be 45'-0" unless otherwise noted on the purchase order.
- 5.2.6. Endlaps
 - 5.2.6.1. Endlaps shall have a 16 gauge backup plate. The panel shall have the eight endlap joint fasteners installed in six pre-punched holes in the flat and in the dimples in the trapezoidal legs.
 - 5.2.6.2. Mastic (see Sealants And Closures) shall be applied between the panels and secured with 1/4" - #14 x 1 1/4 self-drilling fasteners through the panels, and backup plate to form a compression joint.
 - 5.2.6.3. Endlaps and eaves shall be the only places in the roof system where through the roof fasteners can be used inside the building envelope.
- 5.2.7. Fasteners
 - 5.2.7.1. Eave - 1/4" - #14 x 1 1/4" long life self-drilling with sealing washer.
 - 5.2.7.2. Endlaps - 1/4" - #14 x 1 1/4" long life self-drilling with sealing washer.
 - 5.2.7.3. Ridge - #14 x 7/8" Lap Tek long life self-drilling with sealing washer.
 - 5.2.7.4. Clips/to purlin - 1/4" - #14 x 1 1/4" Tek 2 long life self-drilling with Hex Washer Head and 5/8" O.D. washer.
 - 5.2.7.5. Clips/floating to bar joists - #12-24 x 1 1/4" Tek 4.5 self-drilling with Washer Head and 5/8" O.D. washer.
 - 5.2.7.6. Long Life fasteners, where exposed, are standard when using an acrylic coated Galvalume® roof panel.
- 5.2.8. Clips
 - 5.2.8.1. All clips shall have factory-applied mastic and be designed so that movement between the panel and the clip does not occur.
 - 5.2.8.2. Ultra-Dek Low fixed clips - shall be 3 3/8" in height providing a 3/8" clearance for insulation between the panel and the purlin or joist.
 - 5.2.8.3. Ultra-Dek High fixed clips - shall be 4 3/8" in height to accommodate a thermal spacer for added insulation at the purlins.
 - 5.2.8.4. Ultra-Dek or Double-Lok Low or High floating clips - shall be either 3 3/8" or 4 3/8" in height. Floating clips shall provide a minimum of 2" travel to allow for expansion and contraction.
- 5.2.9. Sealant And Closures
 - 5.2.9.1. Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic - Q41A.
 - 5.2.9.2. Field applied sealant used at the endlaps, eave, ridge assembly, and gable flashings shall be 100% solids butyl-based elastomeric

tape sealant, furnished in roll form or pre-cut to length. See manual for application.

- 5.2.9.3. Outside closures shall be manufactured from the same materials as the roof panels.
 - 5.2.9.4. Inside closures shall be 18-gauge Galvalume® or galvanized coated metal.
- ## 5.3. Standing Seam Roof
- ### Panel Type - BattenLok® (Machine Seamed) and SuperLok® (Machine Seamed)
- 5.3.1. Panel Description
 - 5.3.1.1. Standing Seam Roof Panels shall be UL-90 rated, roll-formed, 24 or 22 gauge acrylic coated Galvalume® or pre-painted Galvalume®. Galvalume® sheet shall have 50% aluminum-zinc alloy-coating with a minimum yield of 50 ksi and conform to ASTM 792-99a. Pre-painted finish shall be a premium Fluoropon® coating produced with either Kynar 500® or Hylar 5000® resins and have a full 20 year warranty. Wherever used in this specification, acrylic-coated Galvalume® means Galvalume® with a light acrylic coating such as Galvalume Plus by Bethlehem, Acrylume by National or Galvalume Plus by U.S. Steel. This coating eliminates the need for roll-forming oil and reduces the incidence of field marking by handling or foot traffic.
 - 5.3.1.2. Panel profiles shall be 2" inches high x 16" wide. Panel seam is 2" high. All panels shall be striated.
 - 5.3.1.3. One side of the panel shall be female in configuration, which will have factory applied hot-melt mastic (see Sealants And Closures) inside the female seam. The female side will fit over the male side and be continuously locked together by an electrically powered mechanical seamer.
 - 5.3.1.4. Maximum panel length shall be no more than 45'-0" unless otherwise discussed and approved by the manufacturer.
 - 5.3.2. Endlaps
 - 5.3.2.1. Endlaps shall have pre-punched holes in panels and a 16 gauge backup plate for proper placement of fasteners.
 - 5.3.2.2. Mastic (see Sealants And Closures) shall be applied between the panels and secured with #14 x 1 1/4" Long Life self-drilling fasteners with sealing washer, through the upper panel, mastic, lower panel and backup plate to form a compression joint.
 - 5.3.2.3. Endlaps and eaves shall be the only places in the roof system where through-the-roof exposed fasteners will be used inside the building envelope.
 - 5.3.3. Fasteners
 - 5.3.3.1. Eave - #12 x 1 1/4" long life self-drilling with sealing washer.
 - 5.3.3.2. Endlaps - #14 x 1 1/4" long life self-drilling with sealing washer.
 - 5.3.3.3. Ridge - #14 x 7/8" Lap Tek long life self-drilling with sealing washer.
 - 5.3.3.4. Clips to purlin - #12 x 1 1/4" Tek 2 self-drilling with Hex Head without washer.
 - 5.3.3.5. Clips to bar joists - #12-24 x 1 1/4" Tek 4.5 self-drilling with Hex Head without washer.
 - 5.3.3.6. Long Life fasteners, where exposed, either self-drilling or self-tapping, utilizing corrosion resistant head with an extended long life warranty, are standard. These fasteners are recommended for use when using an acrylic coated Galvalume® roof panel.
 - 5.3.3.7. Special applications may require the use of other fastener types than those listed above.
 - 5.3.4. Clips
 - 5.3.4.1. All clips shall have factory-applied mastic.
 - 5.3.4.2. Fixed clips - shall be either 2 3/8" or 3" in height and are to be used with blanket insulation.
 - 5.3.4.3. Floating clips - shall be either 2 3/8" or 3" in height and are to be used with blanket insulation.
 - 5.3.5. Sealants And Closures
 - 5.3.5.1. Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic - Q41A.
 - 5.3.5.2. Field applied sealant used at the endlaps, eave, ridge assembly, and gable flashings shall be 100% solids butyl-based elastomeric tape sealer, furnished in roll form or pre-cut to length.

5.3.5.3. Outside closures shall be manufactured from the same materials as the roof panels.

SECTION 6. MISCELLANEOUS MATERIAL SPECIFICATIONS

6.1. Fasteners

- 6.1.1. Structural Bolts: All bolts used in connections of secondary framing to primary framing shall be zinc plated ASTM A307 or ASTM A325 as required by design.
- 6.1.2. Fasteners for Roof Panels: All panels shall be attached to the secondary framing members by means of:
- Option #1: Self-drilling structural screws for roofs shall be carbon steel #12-14 x 1 1/4" Hex Washer Head, cadmium or zinc plated, with or without painted head, assembled with EPDM washer. These fasteners are applicable for use with fiberglass blanket insulation from 1" to 3" thick.
 - Option #2: Self-drilling structural screws shall be carbon steel #12-14 x 1 1/2" Hex Washer Head, cadmium or zinc plated, with or without painted head, assembled with EPDM washer. These fasteners are applicable for use with fiberglass blanket insulation from 3 1/2" to 6" thick.
 - Option #3: Self-tapping screws shall be #14 x 3/4" type "A" or "AB", zinc plated, painted or plain head assembled with a bonded or separate EPDM washer. These fasteners are applicable for use with fiberglass blanket insulation from 1" to 3" thick. Longer lengths are available. Pre-drilling is required.
 - Option #4: Optional Long Life fastener, in either self-tapping or self-drilling fasteners. Recommended when using acrylic coated Galvalume® panels.
- 6.1.3. Fasteners for Roof Panel Sidelaps are as follows:
- Option #1: Self-drilling - #14 x 7/8" Lap Tek zinc plated, painted or plain head assembled with sealing washer.
 - Option #2: Above fasteners in a Long Life finish, either in self-drilling or self-tapping. Corrosion resistant head with a long life extended warranty. These fasteners are recommended when using acrylic coated Galvalume® panels.
 - Option #3: Self-tapping - #14 x 3/4" type "A" or "AB" zinc plated, painted or plain head assembled with sealing washer.
- 6.1.4. Fasteners for the Standing Seam Roof Panels and clips: See Sections 5.2.7 and 5.3.3.
- 6.1.5. Fasteners for Wall Panels: All "PBR", "A", "AM" and "U" Panels shall be attached to the secondary framing members by means of:
- Option #1: Self-drilling fasteners of carbon steel #12 x 1 1/4" without washers as herein described for fiberglass insulation up to 3" thick and #12 x 1 1/2" for fiberglass insulation 3" to 6" thick.
 - Option #2: Corrosion resistant type Long Life fasteners with sealing washers, either self-tapping or self-drilling, as herein described.
 - Option #3: Self-tapping #14 x 3/4" carbon steel fasteners as herein described. These fasteners are applicable with fiberglass insulation up to 3" thick. #14 x 1-1/2" fasteners are required for 3" to 6" thick insulation. Pre-drilling is required.
- 6.1.6. Fasteners for Wall Panel Sidelaps:
- Option #1: Self-drilling - #14 x 7/8" carbon steel screws as herein described.
 - Option #2: Corrosion resistant type Long Life fasteners with sealing washers, either self-drilling or self-tapping, as herein described.
 - Option #3: Self-tapping - #14 x 3/4" carbon steel screws as herein described. Pre-drilling is required.
- 6.1.7. Blind Rivets: All blind rivets shall be 1/8" diameter, high strength stainless steel pull rivet Type ADH.
- 6.1.8. Fasteners for "Retro R" Panel are as follows: Roof & wall sidelaps - self-tapping fasteners shall be #14 x 3/4" Type "A", Long Life corrosion resistant plain or painted head with a bonded EPDM washer. Also available is a 3/16" TLR rivet, plain or painted, with a bonded EPDM washer. Pre-drilling of panel sidelaps will be required. These will also be used at the roof eave, endlap, ridge

and at intermediate rib locations. If being used as a wall panel, the fasteners would be used at wall base, eave, endlap, and intermediate ribs. See Construction Drawings for locations.

6.2. Sealants And Closures

- 6.2.1. Closure Strips: the corrugations of the roof and wall panels shall be filled with closures along the eave, ridge rake or base when required for weather tightness. Closures must be ordered separately.
- 6.2.2. Standing Seam Roof Closures: See Sections 5.2.9 and 5.3.5.
- 6.2.3. Sealants: Roof panels shall be sealed with 3/32" x 3/8" wide tape sealant. The material shall be a Butyl base elastic compound with a minimum solid content of 99%, Schnee-Moorehead #522 or equal. The sealant shall have good adhesion to metal and be non-staining, non-corrosive, non-shrinking, non-oxidizing, non-toxic and non-volatile. The service temperature shall be from -60°F to +300°F. Optional 3/32" x 1" tape is available.
- 6.2.4. Standing Seam Sealant: See Sections 5.2.9 & 5.3.5.
- 6.2.5. Caulk: All gutter and downspout joints, rake flashing laps, ridge flashing laps, doors, windows, and louvers shall be sealed with white, burnished slate, or gray pigmented caulk of Butyl rubber base, or clear silicone.

6.3. Gutter, Flashing And Downspouts

- 6.3.1. Gutters and Flashing: All standard exterior gutters are 26 gauge steel with a painted finish in standard colors. Standard rake flashing is 26 gauge steel with painted finish in standard colors.
- 6.3.2. Downspouts: All downspouts shall be 26 gauge, rectangular in shape, steel with painted finish in standard colors.
- 6.3.3. Gutters and downspouts shall be sized according to ordinary industry practices to handle rainwater. Special provisions for rainwater over flow, icing, and blocked downspouts should be considered by the builder and owner.

6.4. Flashing And Trim

- 6.4.1. Flashing at the rake (parallel to roof panels) and high eave shall not compromise the integrity of the roof system by constricting movement due to thermal expansion and contraction.
- 6.4.2. All flashing shall be manufactured from Galvalume® steel, whether pre-painted or acrylic coated Galvalume.

6.5. Painting

- 6.5.1. Structural Painting
- 6.5.1.1. All uncoated structural steel shall be cleaned of all foreign matter and loose scale in accordance with SSPC-SP2 and given a one mill coat of red oxide primer. Primer shall be applied by the use of airless handguns or by dip-tank emersion. Primer generally meets or exceeds the performance requirements of Federal Specification TT-P-636D.
- 6.5.1.2. Light gauge "Z" and "C" section steel members shall be shot blasted and pre-coated with one coat of red oxide primer. Some hand sprayed shop touch-up may be employed.
- 6.5.1.3. Abrasions caused by handling after painting are to be expected. Primer shall be furnished to touch-up or field painting as specified in the contract documents.

6.6. Painted Steel Panels

- 6.6.1. Base metal shall be nominal 29, 26, 24, or 22 gauge Galvalume® steel.
- 6.6.2. Prime Coat: The base metal shall be pre-treated and then primed with an epoxy type primer for superior adhesion and superior resistance to corrosion.
- 6.6.3. Oil canning is an aesthetic issue. Normally, structural integrity is not affected; however, it must be reviewed if the distortion is extreme. Such distortion might indicate movement within the primary structure or distress connections within the panel system. Since many uncontrollable factors are involved, no manufacturer can realistically assure the total elimination of oil canning. With careful attention to the production and selection of material, to panel design, and to installation practice, oil canning can be effectively minimized.

SECTION 7. ACCESSORIES

7.1. Windows

- 7.1.1. Standard (AHS) Windows shall be horizontal slide units, 3'-0" x 3'-0", 4'-0" x 3'-0", 4'-0" x 4'-0", 6'-0" x 3'-0". Finish shall be polished aluminum (mill finish) or optional bronze finish. Glazing will be DSB or optional 7/16" thick hermetically sealed glass. Glass shall be clear or bronze, and may be insulated as an option. They shall be furnished complete with hardware, and half screen. Windows shall be self-flashing to wall panels. They shall be certified by Architectural Aluminum Manufacturers Association for performance requirements of ANSI/AAMA 101-85.
- 7.1.2. Slim-Line (SL) windows are 2'-0" wide x 7'-0" high with a bronze frame finish. These windows are self-framing to the wall panel. Slim-Line windows shall have tempered gray glass.

7.2. Personnel Doors

- 7.2.1. Standard personnel doors shall be 3'-0", 4'-0" and 6'-0" x 7'-0" x 1 3/4" manufactured from 20 gauge galvanized steel. Door shall have square edges for non-handed installation. Door shall have an embossed finish with a white or bronze prime coat. Doors shall be flush and have vertical mechanical interlocking seams on both hinge and lock edges. Doors shall be provided with top and bottom inverted 16 gauge galvanized steel channels spot-welded within the door. Doors shall be reinforced, stiffened, and sound deadened with resin impregnated kraft fiber honeycomb core with a nominal 1" cell size. Honeycomb core shall completely fill the inside faces of the door and be laminated to the inside faces of the panels by means of moisture resistant, contact type adhesive. Doors shall be reinforced for applicable hardware. Doors shall be solid, half glass, or side vision (narrow lite). All glazing shall be done in the field. Glass is not provided by Manufacturer.
- 7.2.2. Door frames shall be 16 gauge galvanized steel, pre-painted white. Door jambs shall be constructed for non-hand installation. Door frames shall optional head and jamb flashing and optional weather strip. Door frames shall be provided with 1-1/2 pair of 4-1/2" x 4-1/2" hinges and reversible ANSI strike plate. Doors and frames shall be reinforced with 7 gauge hinge reinforcements.
- 7.2.3. Standard cylindrical lever locksets (levers both sides) shall meet ANSI #A156.2, Series 4000, Grade 2. The lockset selected by owner should be chosen in accordance with all current federal, state and local laws for the type of access required and the nature of use of the building.
- 7.2.4. Door threshold shall be aluminum, supplied with flat head fasteners and expansion shields for attachment to masonry floor.

7.3. Overhead Door Framing

- 7.3.1. Overhead door support framing shall be designed to resist applicable wind loads and shall consist of channel jambs with a structural header at the top of the opening. Twenty-six gauge galvanized steel flashings, color coordinated, can be provided to conceal panel edges around the opening when requested.

7.4. Gravity Ridge Ventilators

- 7.4.1. Gravity ridge ventilators shall be manufactured from galvanized steel and painted white. The ventilator body shall be 26 gauge and the skirt shall match the roof slope. Chain operated damper will be furnished when specified. Ventilators shall be equipped with standard bird screens and riveted end caps. Ventilators shall be 10' long and have 12" throat.

7.5. Louvers

- 7.5.1. Standard Louvers shall have a 26 gauge galvanized steel frame, painted, with 26 gauge blades. Heavy Duty Louver frames shall be 18 gauge galvanized steel frame, painted, with 20 gauge blades. Both Standard and Heavy Duty louvers shall be self-framing and self-flashing. They shall be equipped with adjustable or fixed blades as specified. Nominal sizes shall be 2'-0" x 2'-0", 3'-0" x 2'-0", 3'-0" x 3'-0" 4'-0" x 3'-0", and 3'-0" x 4'-0".

7.6. Light Transmitting Panels

- 7.6.1. High Strength Light Transmitting Panels are acrylic resin and Acrylic gelcoat with fiberglass reinforcement or acrylic modified polyester.
- Type 1, structural (general purpose) conforming to commercial standard ASTM D3841 or:
 - Type 2, having a burn rate of 2 1/2" per minute or less when tested in accordance with ASTM D635. Type 2 panels are offered in acrylic modified polyester only.
- 7.6.2. High Strength translucent panels match standard profiles, are 1/16" thick, weigh 8 ounces per square foot, and are white with a smooth top surface.
- 7.6.3. Insulated translucent panels are available in Type 1, "R" panel and Standing Seam panel profiles only.

7.7. Insulation

- 7.7.1. Fiberglass Blanket Insulation shall have a density of 0.75 pcf and shall be available in 3", and 4", and 6" thickness. (Other insulation systems are available with thickness up to 8").
- 7.7.2. Fiberglass insulation facings shall be laminated on one side with vinyl, vinyl scrim foil, or foil scrim kraft facing.
- 7.7.3. Rigid Foam Thermal Blocks are cut from high density extruded polystyrene board stock, having a UL 25 flame spread rating.

SECTION 8. ERECTION AND INSTALLATION

8.1. Erection and Installation

- 8.1.1. A qualified erector, using proper tools and equipment shall perform the erection of the metal building components. Erector shall follow good, sound, safe procedures and guidelines in accordance with any applicable federal, state or local laws.
- 8.1.2. Erection of the roof system shall be in complete accordance with the Manufacturer's Safety and Erection Manual. Any deviation from this manual could result in damage to the roof system or building structure, for which Manufacturer will not be liable for repair or replacement.
- 8.1.3. Should the erector need building component weights, these shall be supplied by the manufacturer upon request.

SECTION 9. BUILDING ANCHORAGE AND FOUNDATIONS

9.1. Building Anchorage and Foundations

- 9.1.1. The building anchor bolts shall be designed to resist the maximum column reactions resulting from the specified combinations of loadings. The manufacturer shall specify the minimum diameter, spacing and projections required to transfer the loads from the column to the anchor bolts. Anchor bolts will be supplied by the contractor and NOT by the manufacturer. Anchor bolt quantity at each base plate shall be in compliance with OSHA Subpart R regulations.
- 9.1.2. Foundations shall be adequately designed by a qualified foundation engineer to support the building reactions and other loads that may be imposed by the building use. The design shall be based on the specific soil conditions of the building site. The foundation engineer shall be retained by other than the manufacturer. The manufacturer assumes no responsibility for the integrity of the foundation. The foundation engineer shall be responsible for the transfer of reactions from the anchor bolts to the foundations.

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