STANDARD SPECIFICATIONS
These specifications are 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 insure that the architect, engineer, building and/or owner understands the basis for design, manufacture and application of all the manufacturer's metal building systems.

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. Gable Symmetrical is a continuous frame building with a ridge in the center of the building, consisting of tapered or straight columns and tapered rafters. Although roof pitch may vary, standard roof slope is 1:12. Sidewall girts may be continuous, by-passing the columns or simple span, flush in the column line. Rafters may or may not have interior columns. A ridged (double slope) building in which the ridge is in the center of the building.

1.2.2. Gable Unsymmetrical is a continuous frame building with and off-center ridge, consisting of tapered or straight columns and tapered rafters. Eave height and roof slope may differ on each side of ridge. Sidewall girts may be continuous, by-passing the columns or simple span, flush in the column line. Rafters may or may not have interior columns.

1.2.3. Single Slope is a continuous frame building, which does not contain ridge, but consists on one continuous slope from side to side. Building consists of tapered or straight columns and tapered or straight rafters. Sidewall girts may be continuous, by-passing the columns or simple span, flush in the column line. Building may or may not have interior columns.

1.2.4. Lean-To (LT) is a building extension, which does not contain a ridge, but consists of one continuous roof slope from side to side instead of ridge to side. These units usually have the same roof slope and girt design as the building to which they are attached.

1.2.5. 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 girts.

1.3.3. Building "Eave Height" is a nominal dimension measured from the bottom of the base plate on the column to the intersection of the inside of the roof and sidewall sheets.

1.3.4. Building "Length" is measured from outside to outside of endwall girts.

1.3.5. Standard "Bay Spacing" shall be 20', 25' or 30' between frame centerlines (except at end bays) unless otherwise specified, for buildings with "A" or "R" panels.

1.3.6. Standard "Bay Spacing" shall be 20', 24' or 28' between frame centerlines (except at end bays) for buildings with Shadow Panels.

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.

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.
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 by 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 - horizontal loads acting in any direction a structural system due to action of any 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. 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, with minimum yield of 36, 42, or 50 psi.
3.1.2. Steel for built-up sections shall generally conform to the physical requirements of ASTM D529, ASTM 572 or ASTM A36 as applicable, with minimum yield of 42,000, 50,000, or 55,000 psi as indicated by the design requirements.
3.1.3. Steel for endwall "C" sections shall generally conform to the physical requirements of ASTM A607 GR55M or equivalent, and have a minimum yield of 55,000 psi.

3.2. Secondary Framing Steel

3.2.1. Steel used to form purlins, girts, eave struts and "C" sections shall be Republic Steel P-55 or equivalent, comparable to the requirements of ASTM A607 Grade 55. Minimum yield shall be 55,000 psi.

3.3. Roof And Wall Panel Material

3.3.1. Panel material as specified shall be 26 gauge Galvalume® AZ55 coated steel, if Galvalume Plus® conforming to the requirements of ASTM A792, Grade 80 or Grade 50, as manufactured by Bethlehem Steel Corporation, or equal. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, conforming to the requirements of ASTM A792, Grade 80 or Grade 50, as manufactured by Bethlehem Steel Corporation, or Galvanized G60 pre-coated steel, conforming to the requirements of ASTM A653 or Galvanized G90 pre-coated steel, conforming to the requirements of ASTM A653. Galvalume® and Galvanized steel sheet shall have a coating weight of .5oz/sq.ft. Grade 80 or Grade 50. Minimum yield stress shall be 80,000 Ksi for Grade 80 and 50,000 Ksi for Grade 50.

3.3.2. Panel material as specified shall be 24 gauge Galvalume® AZ55 coated steel, if Galvalume Plus® conforming to the requirements of ASTM A792, Grade 80 or Grade 50, as manufactured by Bethlehem Steel Corporation, or equal. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, conforming to the requirements of ASTM A792, Grade 80 or Grade 50, as manufactured by Bethlehem Steel Corporation, or Galvanized G60, conforming to the requirements of ASTM A653 or Galvanized G90, conforming to the requirements of ASTM A653. Galvalume® and Galvanized steel sheet shall have a coating weight of .5oz/sq.ft. Grade 80 or Grade 50. Minimum yield stress shall be 80,000 Ksi for Grade 80 and 50,000 Ksi for Grade 50.

3.3.3. See 5.1.4 for additional material used.

SECTION 4. STRUCTURAL FRAMING

4.1. General

4.1.1. 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.

4.1.2. 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.

4.1.3. All framing members, where necessary, shall carry an easily identifying mark.

4.2. Primary Framing

4.2.1. 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.

4.2.2. 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.

4.2.3. Plates, Stiffeners, etc.: All base plates, splice plates, cap plates, and stiffeners shall be factory welded into place on the structural members.

4.2.4. 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.

4.2.5. Connections for secondary structural (purlins and girts) shall be by means of welded clips.

4.3. Secondary Framing

4.3.1. 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 prepunched 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 webs, or flanges as determined by design.

4.3.2. Eave Struts: Eave Struts shall be unequal or equal flange cold-formed "C" sections.

4.3.3. 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.

4.4. Bracing

4.4.1. Diagonal Bracing: Diagonal bracing in the roof and sidewalls shall be used to remove longitudinal loads (wind, crane, etc.) from the structure. This bracing will be furnished to length and equipped with bevel 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.

4.4.2. 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.

4.4.3. 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.

SECTION 5. ROOF AND WALL COVERING

5.1. General

5.1.1. Roof panels shall be any of the following: "R" Panel, "PBR" Panel, "U" Panel, “VSHR-2” insulated panel, or Standing Seam Panel as specified. “PBR” panels shall have an extended purlin bearing leg. For Standing Seam see Sections 5.3 and 5.4.

5.1.2. Wall panels may be any of the following: "R" Panel, “A” Panel, "U" Panel, "PBR" Panel, “Shadow Panel”, “NuWall®” panel, “Reverse R” panel, “Reverse U” panel, “VSHR-2” insulated panel, “VS200” insulated panel, or “VS300” insulated panel. “PBR” panels shall have an extended purlin bearing leg.

5.1.3. Roof and wall panels as specified shall be 26 or 24 gauge pre-coated Galvalume® AZ55 steel, if Galvalume Plus®. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, or Galvanized G60, or Galvanized G90 pre-coated steel.

5.1.4. Architectural wall panels as specified shall be 26 gauge Galvalume® AZ55 steel, if Galvalume Plus®. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, or Galvanized G60, or Galvanized G90 pre-coated steel.

5.1.5. Shadow Panels shall be embossed 24 gauge Galvalume® AZ55 steel, if Galvalume Plus®. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, or Galvanized G60, or Galvanized G90.

5.1.6. Standing Seam Roof Panels - See Sections 5.3 and 5.4.

5.1.7. Agricultural Panel – “Stormproof®” liner panels as specified shall be 29 gauge Galvalume® AZ55 steel, if Galvalume Plus®. If panel is pre-painted, substrate shall be either Galvalume® AZ50 or AZ55, or Galvanized G60, or Galvanized G90 pre-coated steel.

5.2. Panel Description

5.2.1. "U" 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.

5.2.2. "R" 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.

5.2.3. "PBR" (Purlin bearing leg) 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.

5.2.4. Architectural ("A") 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.

5.2.5. Architectural Shadow Wall Panel shall have a configuration consisting of a 5 ¼” flat area with a 1 ½” indentation in the middle of the panel. Panel coverage is to be 16" wide, with a panel depth of 3". The panel design produces a hidden fastener panel.

5.2.6. Architectural “NuWall®” Panel shall be 2 ½” deep x 12” wide with ½” deep fluting with concealed fasteners.

5.2.7. “Stormproof®” Panel shall have major ribs ¾” high spaced 9” 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.

5.2.8. “RetroR®” (Retro-Fit) Panel shall have major ribs 1” 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.

5.2.9. “Artisan® L12” Panel shall have 1” high ribs at edge of 12” wide flat valley pan. Panel shall provide 12” net coverage in width. Ribs shall be interlocking and fastened with a concealed fastener. Panel is also available with optional two minor stiffening beads (ribs) spaced at 4” centers.

5.2.10. “VSHR-2” insulated panel shall have an exterior face with 1 3/8 high ribs spaced at 1’-1 11/32” on center. In the flat area centered between the major ribs is one smaller minor rib. In the flat area centered between the each major rib and the minor rib is a minor stiffening bead. Sandwiched between the exterior and interior panels is 2” of factory assembled free-foamed urethane with a density of 2.4 lbs. / cu. ft. Interior face has 3/32” shadow lines (beads) at 2 ½” on center. Panel shall provide 3’-4” net coverage in width. All sidelaps shall be one major rib. VSHR insulated panel is also available by special order in a thickness of 1”, 1 ½”, 2 ½”, 3’, 4” & 5”.

5.2.11. VS-200-2 insulated panel shall have an exterior face with 7/32” deep x 2 ¼” wide inverted dominant minor ribs spaced at 8 3/8” on center. In the flat area centered between the dominant minor ribs is one smaller 5/32” deep x 1 3/8” wide inverted minor rib. Sandwiched between the exterior and interior panels is 2” of factory assembled free-foamed urethane with a density of 2.4 lbs. / cu. ft. Interior face has 3/32” shadow Vee lines (beads) at 2 5/8” on center. Panel shall provide 3’-6” net coverage in width. Sidelaps shall be comprised of a tongue and groove joint profile, which conceals a 14 gage hidden attachment clip and fastener. This concealed fastener joint has a bead of continuous factory applied butyl caulk in the female groove. VS-200 insulated panel is also available by special order in a thickness of 2 ½”, 3’, 4”, 5” & 6”.

5.2.12. VS-300-2 2 insulated panel shall have an exterior and interior face with 3/32” shadow Vee lines (beads) at 2 5/8” on center. Sandwiched between the exterior and interior panels is 2” of factory assembled free-foamed urethane with a density of 2.4 lbs. / cu. ft. Panel shall provide 3’-6” net coverage in width. Sidelaps shall be comprised of a tongue and groove joint profile, which conceals a 14 gage hidden attachment clip and fastener. This concealed fastener joint has a bead of continuous factory applied butyl caulk in the female groove. VS-300 insulated panel is also available by special order in a thickness of 2 ½”, 3’, 4”, 5” & 6”.

5.2.13. 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 unless the design of the panel dictates otherwise.

5.2.14. 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.

5.3. Standing Seam Roof

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

5.3.1. Standing Seam Roof Panels shall be UL-90 rated, roll-formed, 24 or 22 gauge Galvalume®, if Galvalume Plus®. If roof panels are pre-painted, substrate shall be either Galvalume®, Galvanized G60, or Galvanized G90. Galvalume® and Galvanized steel sheet shall have a coating weight of .5oz/sq.ft. with a minimum yield of 50,000 ksi. Pre-painted finish shall be a premium Fluoropon Coating produced with either Kynar 500® for Hylar 5000® resins and have a full 20 year warranty.

5.3.2. Panels shall be in 12", 18" or 24" widths (as per the contract drawings), with two minor ribs in between seams. Panel seam is 3” high.

5.3.3. One side of the panel shall be female in configuration, which will have factory applied hot-melt mastic (see 5.3.9) inside the female seam, and be suitable to accept the other male side. The female side will snap over the male side. When using Ultra-Dek® Standing Seam, the male and female seams will form a self- locking snap system assembly. 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.

5.3.4. 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 toward each other.

5.3.5. Maximum panel length shall be no more than 45'-0" unless otherwise discussed and approved by the sales or manufacturing manager.

5.3.6. Endlaps

5.3.6.1. Endlaps shall have a 16 gauge backup plate. The panel shall have five pre-punched holes in the flat and dimples in the trapezoidal legs for proper placement of fasteners.

5.3.6.2. Mastic (see sealants and closures 5.3.9.) shall be applied between the panels and secured with a 1/4-14 x 1 ¼” self drilling fasteners through the panels, and backup plate to form a compression joint.

5.3.6.3. Endlaps and eaves shall be the only place in the roof system where through the roof fasteners can be used inside the building envelope.

5.3.7. Fasteners

5.3.7.1. Eave – 1/4-14 x 1 ¼” long life self-drilling with sealing washer.

5.3.7.2. Endlaps – 1/4-14 x 1 ¼” long life self-drilling with sealing washer.

5.3.7.3. Ridge – #14 x 7/8" Lap Tek self-drilling with sealing washer.
5.3.7.4. Clips/fixed to purlin – 1/4-14 x 1" Tek 2 self-drilling with hex washer head and 5/8" O.D. washer.
5.3.7.5. Clips/floating to bar joists – #12-24 x 1 ¼"" Tek 4.5 self-drilling with hex washer head and 5/8" O.D. washer.
5.3.7.6. Long life fasteners, where exposed, are standard when using a Galvalume Plus® roof panel.
5.3.8. Clips
5.3.8.1 All clips shall have factory applied mastic and be designed so that movement between the panel and clip does not occur.
5.3.8.2 Low fixed clips – shall be 3 3/8" in height, providing a clearance for insulation between the panel and the purlin or joist.
5.3.8.3 High fixed clips – shall be 4 3/8" in height, to accommodate a thermal spacer for added insulation at the purlins.
5.3.8.4 Low or High floating clips – shall be 3 3/8" or 4 3/8" in height. Floating clips shall provide a minimum of 2" travel to allow for expansion and contraction.
5.3.9. Sealants and Closures
5.3.9.1. Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic – Q41A.
5.3.9.2. 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.
5.3.9.3. Outside closures shall be manufactured from the same materials as the roof panels.
5.3.9.4. Inside closures shall be 18 gauge metal.

5.4. Standing Seam Roof
Panel Type – BattenLok® and SuperLok® (Machine Seamed Systems)
5.4.1. Panel Description
5.4.1.1. Standing Seam Roof Panels shall be UL-90 rated, roll-formed, 24 or 22 gauge Galvalume®, if Galvalume Plus®. If roof panels are pre-painted, substrate shall be either Galvalume®, Galvanized G60, or Galvanized G90. Galvalume® and Galvanized steel sheet shall have a coating weight of .5oz/sq.ft. with a minimum yield of 50,000 ksi. Pre-painted finish shall be a premium Fluoropon Coating produced with either Kynar 500® for Hylar 5000® resins and have a full 20 year warranty.
5.4.1.2. Panels profile shall be 2" high x 16" wide. Panel seam is 2" high. All panels shall be striated.
5.4.1.3. One side of the panel shall be female in configuration, which will have factory applied hot-melt mastic (see 5.4.9) inside the female seam, and be suitable to accept the other male side. The female side will fit over the male side and be continuously locked together by an electrically powered mechanical seamer.
5.4.1.4. Maximum panel length shall be no more than 45'-0" unless otherwise discussed and approved by the sales or manufacturing manager.
5.4.2. Endlaps
5.4.2.1. Endlaps shall have pre-punched holes in panel and a 16 gauge backup plate for proper placement of fasteners.
5.4.2.2. Mastic (see sealants and closures 5.4.5.) shall be applied between the panels and secured with #14 x 1" Long Life self-drilling fasteners with sealing washer, through the upper panel, mastic, lower panel and backup plate to form a compression joint.
5.4.2.3. Endlaps and eaves shall be the only place in the roof system where through the roof fasteners can be used inside the building envelope.
5.4.3. Fasteners
5.4.3.1. Eave – #12 x 1" long life self-drilling with sealing washer.
5.4.3.2. Endlaps – #14 1 ¼" long life self-drilling with sealing washer.
5.4.3.3. Ridge – #14 x 7/8" Lap Tek self-drilling with sealing washer.
5.4.3.4. Clips to purlin – #12 x 1" Tek 2 self-drilling with hex washer head without washer.
5.4.3.5. Clips to bar joists – #12-24 x 1 ¼"" Tek 4.5 self-drilling with hex head without washer.
5.4.3.6. 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 when using a Galvalume Plus® roof panel.
5.4.3.7. Special applications may require the use of other fastener types than what are listed above. Review Erection Manual.
5.4.4. Clips
5.4.4.1. All clips shall have factory applied mastic and be designed so that movement between the panel and clip does not occur.
5.4.4.2. Fixed clips – shall be either 2 3/8" or 3" in height, and are to be used with blanket insulation.

5.4.4.3. Floating clips - shall be either 2 3/8” or 3” in height, and are to be used with blanket insulation.
5.4.5. Sealants And Closures
5.4.5.1 Factory applied sealant used in panel sidelaps shall be a hot melt, foamable mastic – Q41A.
5.4.5.2 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.
5.4.5.3 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 frame splices and 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:
   a. Standard: Self-drilling structural screws for roofs shall be carbon steel No. #12-14 x 1" 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 0" to 3" thick.
   b. Alternate No. 1: Self-drilling structural screws for roofs shall be carbon steel No. #12-14 x 1" 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 ½” to 6" thick.
   c. Alternate No 2: Self-tapping structural screws shall be carbon steel No. #14 x 3/4" type “A” or “AB”, cadmium or zinc plated, painted or plain headed assembled with a bonded or separate EPDM washer. These fasteners are applicable for use with fiberglass blanket insulation from 0” to 3" thick. Longer lengths are available. Pre-drilling is required.
   d. Alternate No. 4: Optional Long Life fastener, in either self-tapping or self-drilling fasteners. Recommended when using Galvalume Plus® panels.
6.1.3. Fasteners for Roof Panel sidelaps: All "R" or "U" panel roof sidelaps shall be made by means of:
   a. Standard: Self-drilling #14 x 7/8” Lap Tek zinc plated, painted or plain head assembled with sealing washer.
   b. Alternate No. 1: Above fasteners with 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 Galvalume Plus® panels.
   c. Alternate No. 2: Self tapping #14 x ¾” 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 5.3.7 and 5.4.3.
6.1.5. Fasteners for Wall Panels: All "R", “PBR” and "A" Panels shall be attached to the secondary-framing members by means of:
   a. Standard: Self-drilling fasteners of carbon steel #12 x 1" without washers as herein described for fiberglass insulation up to 3" thick and #12 x 1 1/4" for fiberglass insulation from 3 ½”" up to but not including 6" thick.
   b. Alternate No. 1: Corrosion resistant type Long Life fasteners with sealing washers, either self-tapping or self-drilling as described herein.
   c. Alternate No. 2: Self-tapping #14 x 3/4 carbon steel screws as herein described. These fasteners are applicable with fiberglass insulation up to 3” thick. #14 x 1" fasteners are required from 3” up to but not including 6" thick insulation. Pre-drilling is required.
6.1.6. Fasteners for Wall Panel Sidelaps:
   a. Standard: Self-drilling #14 x 7/8” carbon steel screws as herein described.
   b. Alternate No. 1: Corrosion resistant type Long Life fasteners with sealing washers, either self-tapping or self-drilling as described herein.
   c. Self-tapping #14 x 3/4” carbon steel screws as herein described. Pre-drilling is required.
6.1.7. Blind Rivets: All blind rivet fasteners shall be 1/8" diameter, high strength stainless steel pull rivet Type ADH.
6.1.8. Fasteners for RetroR® Panel: Roof and Wall sidelaps – self-tapping fasteners shall be #14 x ¾” 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 Erection Manual for locations.

6.2. Sealants And Closures

6.2.1. Closure Strips: the corrugations of the roof and wall panels shall be filled with solid or closed-cell, performed rubber, neoprene or polyethylene 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 5.3.9 and 5.4.5.

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^{o}F to +300^{o}F. Optional 3/32" x 1" tape is available.

6.2.4. Standing Seam Sealant: See Sections 5.3.9 and 5.4.5.

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, and flashing, if bare are 26 gauge Galvalume® steel®, if Galvalume Plus®. If gutters and flashing are painted, substrate shall be either Galvalume®, Galvanized G60, or Galvanized G90 steel sheet with painted finish in standard colors.

6.3.2. Downspouts: All downspouts, if bare are 26 gauge Galvalume® steel®, if Galvalume Plus®. If downspouts are painted, substrate shall be either Galvalume®, Galvanized G60, or Galvanized G90 steel sheet with painted finish in standard colors and are rectangular in shape.

SECTION 7. PAINTING

7.1. Structural Painting

7.1.1. All uncoated structural steel shall be cleaned of foreign matter and loose scale and given a coat of red oxide primer. Primer shall be applied by the use of spray guns. The coat of shop primer is intended to protect the steel for only a short period of exposure to ordinary atmospheric conditions (not including chemical, salt air or other caustic or corrosive conditions). This single coat of shop primer is not corrosion resistant, is subject to fade if exposed to the elements beyond a short period of time, and is not intended to be a final finished coat.

7.1.2. Light gauge steel members shall be shot blasted and pre-coated with one coat of red oxide primer. Some hand sprayed shop touch-up as per 7.1.1 may be employed.

7.1.3. Abrasions caused by handling after painting are to be expected. If specified in the contract documents, Primer shall be furnished for field touch-up.

7.2. Painted Steel Panels

7.2.1. Base metal shall be 29, 26, 24 or 22 gauge Galvalume® steel®, if Galvalume Plus®. If painted, substrate shall be either Galvalume®, Galvanized G60, or Galvanized G90 steel sheet with painted finish in standard colors.

7.2.2. 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. See paint film properties chart on following pages.

SECTION 8. ACCESSORIES

8.1. Windows

8.1.1. Standard Windows shall be horizontal slide units, polished aluminum finish **3'-0" x 3'-0", 4'-0" x 3'-0", 6'-0" x 3'-0" in "A" and "R" Panel walls; 4'0" x 3'0" in Shadow Panels walls. Glazing** will be DSB or optional 7/16" thick hermetically sealed insulated glass. 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.

8.2. Personnel Doors

8.2.1. Standard personnel doors shall be 3'0" 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 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 impregnated kraft honey comb core completely filling the inside faces of the door and laminated to the inside faces of the panels.
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 not provided by Manufacturer.

8.2.2. Door frames shall be 16 gauge galvanized steel, pre-painted white with 8" jamb depth.
Door jambs shall be constructed for non-hand installation.
Door frames shall be provided with 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 strike plate.

8.2.3. Standard cylindrical locksets shall meet ANSI #F81 and Fed Spec. #160A or equal.

8.2.4. Door threshold shall be aluminum, supplied with flat head screws and expansion shields for attachment to masonry floor.

8.3. Sliding Doors

8.3.1. Standard double sliding door sizes shall be 12' wide by 10', 12', 14' or 16' high as specified. All sliding doors shall be designed to withstand applicable wind loads. Doors will be shipped unassembled, complete with bottom guide lock angles for side closure, hoods to protect the top of doors from weather, four-wheel trolleys, and galvanized track. Track shall be supported from a structural header by 3/8" bolts on 2'0" centers.

8.3.2. Each door leaf shall have two four-wheel trolleys. They shall be 2 1/8" in diameter and shall be formed from heavy gauge steel that has been zinc plated and chromated to resist rust. The wheels shall have hardened steel roller bearings sealed with long lasting lubricants.

8.4. Overhead Doors

8.4.1. 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, shall be provided to conceal panel edges around the opening unless otherwise specified.

8.5. Gravity Ridge Ventilators

8.5.1. 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 9" throat. Twelve inch throat ventilators are available as an option.

8.6. Louvers

8.6.1. Louvers frames shall be 18 gauge galvanized steel frame, painted white with 20 gauge blades, and shall be self-framing and self-flashing. They shall be equipped with adjustable or fixed blades as specified. Nominal sizes shall be 3'0" x 2'0", 3'0" x 3'0" and 3'0" x 4'0".

8.7. Skylights

8.7.1. High Strength translucent panels are glass fiber reinforced polyester, high strength and may be either:
   a. Type 1, structural (general purpose) conforming to commercial standard CS-214-57 or
   b. Type II, having a burning rate of 2" per minute or less when tested in accordance with UL R3870A.

8.7.2. High strength translucent panels match standard profiles, are 1/16" thick, weight 8 ounces per square foot, and are white with a granitized top surface.

8.7.3. Insulated translucent panels are available in Type 1, "R" panel and Standing Seam panel profiles only.

8.8. Insulation

8.8.1. Fiberglass Blanket Insulation shall have a density of 0.6 pcf and shall be available in 3", and 4" thickness. (Other insulation systems are available with thickness up to 8").

8.8.2. Fiberglass insulation facings shall be laminated on one side with one of the facings as shown in chart below.

8.8.3. Rigid Foam Thermal Blocks are cut from high density extruded polystyrene board stock, having a UL 25 flame spread rating.

Facing	**3.2 Mil Vinyl**		**Vinyl Scrim Foil**	**Foil Scrim Kraft**	
Color	White	Eg. Wh.	Textured White	Aluminum	Painted White
Flame Spread*	25	25	25	25	25
Perm Rating	1.3	1.3	.02	.02	.02
Surface Temp Min.	0^{o}F	0^{o}F	20^{o}F	-10^{o}F	-10^{o}F

* NOTE: The numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

SECTION 9. ERECTION AND INSTALLATION

The erection of the metal building and the installation of accessories shall be performed in accordance with erection drawings by a qualified erector using proper tools and equipment.

In addition, erection practices shall conform to Section 5, MBMA "Code of Standard Practices". These shall be no field modifications to primary structural members except as authorized and specified by the manufacturer.

SECTION 10. BUILDING ANCHORAGE AND FOUNDATIONS

The building anchor bolts shall be designed to resist the maximum column reactions resulting from the specified combinations of loadings. These designs and sizes shall be specified by the manufacturer. Anchor bolts will be supplied by the contractor and NOT the manufacturer.

Foundations shall be adequately designed by a qualified foundation engineer to support the building reactions and other loads which 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.

FILM PROPERTIES	TEST METHODS & DESCRIPTION		
SUBSTRATE		Galvanized and Galvalume®	Galvanized and Galvalume®
FINISH		Kynar® (Fluoropon/70% Kynar)	Standard Color (10S/30% Silicone Polyester)
Dry Film Thickness Exterior	ASTM D1400 D1005 D4138 NCAA II	0.2 - 0.3 Mils Primer .70 - .90 Mils Topcoat	0.2 - 0.3 Mils Primer .70 - .90 Mils Topcoat
PHYSICAL PROPERTIES			
60° Gloss:	ASTM D523-89	10° - 35°	28° - 60°
Pencil Hardness:	ASTM D3363 (NCCA II-12) Eagle Turquoise Pencil	HB-2H	F-2H
Flexibility: T-Bend:	NCCA II-9 ASTM D4145 No Tape Removal of Film ASTM D522 180° bend around 1/8" mandrel	0T – 2T No adhesion loss	0T – 2T No adhesion loss
Adhesion: (Cross Hatch)	ASTM D3359 (NCAA II-5)	No adhesion loss	No adhesion loss
Reverse Impact:	ASTM D2794 (NCAA II-6) Impact in inch lb. + 1000x metal thickness for steel x 3	No adhesion loss	No adhesion loss
ABUSE TOLERANCE			
Abrasion: Falling Sand:	ASTM D968 Liters to expose 5/32" of substrate	70 +/- 10	40 +/- 10
Transit:	Based on topside to backside contact in transit	Acceptable	Acceptable
Mortar Resistance:	AAMA 605.2 24 hour Pat Test	No effect	No effect
Detergent Resistance:	ASTM D2248 3% Detergent 100°F (72 hours)	No effect	No effect
CORROSION, CHEMICAL & POLLUTION RESISTANCE			
Acid Pollutants:	ASTM D1308, Proc. 7.2 10% Muriatic Acid (15 min.) 20% Sulfuric Acid (24 hours) AAMA 605.2 Test 7.73.1 70% Nitric Acid Vapors (30 min.) Kesternich	No effect No effect Less than 3 units color change No effect 10 cycles	No effect No effect Less than 5 units color change No effect 10 cycles
Alkali Resistance:	ASTM D1308 10% 25% Sodium Hydroxide (1 hour)	No effect No effect	No effect No effect
Salt Fog:	ASTM B117 5% Salt fog 95°F (1000 hours)	1/8" creep from scribe No blisters	1/8" creep from scribe Few #8 blisters
Humidity:	ASTM D2247 100% Relative Humidity @ 100°F (1000 hours)	No effect	Few #8 blisters
WEATHERING PROPERTIES			
Accelerated Weathering	ASTM G23 Weatherometer ASTM D2244 Color ASTM D659 Chalk	1000 hours Maximum of 5 units color change No less than 8	1000 hours Maximum of 5 units color change No less than 8
Exterior Weathering Florida Exposure 20 Years @ 45° South AAMA 605.2	(Fluoropon/70% Kynar) ASTM D2244 Color ASTM D659 Chalk Film Erosion	Maximum 5 units color change No less than 8 Less than 10% film loss	N/A See Below
Exterior Weathering Florida Exposure 20 Years @ 45° South AAMA 605.2	(10S/30% Silicone Polyester) ASTM D2244 Color ASTM D659 Chalk Film Erosion	Vertical (90 Degree Angle) Maximum 5 units color change No less than 8	Non-Vertical Angle > 15 Degrees from Vertical Maximum 6 units color change No less than 7

1) ASTM - American Society Testing and Materials
2) NCAA - National Coil Coaters Association
3) AAMA - American Architectural Manufacturers Association