Metal Building Systems Performance Guide Specification

METAL BUILDING MANUFACTURERS ASSOCIATION
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Performance Guide Specification

This Guide Specification is intended to be used for the development of an office master specification or in the preparation of specifications for a particular project. In either case, the Guide Specification must be edited to fit the conditions of use. Particular attention should be given to the deletion of inapplicable provisions, choosing appropriate options where indicated, and including necessary requirements where blank spaces are provided. Include necessary items related to a particular project.

SECTION 13 34 19 METAL BUILDING SYSTEMS

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Specifier: *The notation [**Specifier Note:**] means that the following text is a specifier's note or sample.*

A. *This specification includes metal building systems designed by the manufacturer and supplied by a single source. The system includes building frames, steel wall and roof systems. Cladding may be other producer supplied under other sections of the specification. Specifications for doors, windows and other fenestrations are included. This specification does not include foundations, floor slab, plumbing, electrical, HVAC, or interior finishing.*
B. *This Section includes performance and prescriptive type specifications. Edit to avoid conflicting requirements.*
C. *This specification covers the design, material, fabrication, shipment and erection of metal building systems. For the material, erection and other fieldwork included and excluded in the metal building system, refer to MBMA Common Industry Practices, Chapter IV of the Metal Building Systems Manual.*

Section 1 – General

1.1 Metal Building System Components

[***Specifier Note:*** *Use this Article carefully; restrict statements to describe components used to assemble the system*].

A. [Clear span rigid frame] [Modular rigid frame supported with intermediate columns] [Truss systems] [ ].

B. [ ] minimum clearance at knee.
[ ] minimum clearance haunch to haunch.
[ ] inch depth straight exterior columns.
[ ] critical dimension at [ ].

C. Bay spacing of [ ] ft. [as shown on drawings].

D. Roof Slope: [1/4] [1/2] [1] [2] [4] [ ] in 12 ([1.5°] [3°] [5°] [10°] [20°] [°]).

E. Primary Framing: Rigid frame of rafter beams and columns, [intermediate columns] [braced end frames] [end wall columns] [canopy beams] [ ].

F. Secondary Framing: [Purlins], [girts], [eave struts], [flange bracing], [ ], and other items detailed.

G. Lateral Bracing: Horizontal loads not resisted by main frame action shall be resisted by [cable] [rod] and/or [diaphragm] [portal frames] [fixed base columns] [ ] in the sidewall. [Diaphragm] and/or [cable] [rod] [portal frame] [fixed base columns] [ ] in the endwall. [Cable] [rod] and/or [diaphragm] [ ] in the roof.

H. Wall and Roof System: Preformed steel panels [insulation], [liner sheets], and accessory components.

I. Accessories: [Ventilators], [louvers], [windows], [doors], [hardware], [ ].

1.2 Related Sections

[***Specifier Note:*** *List the related sections that specify the installation of products specified in this specification and indicate the specific items.*]

A. Section [ ]: Concrete [footings] [grade beams] [floor slab] [ ]

B. Section [ ]: Placement of [anchor rods] [leveling plates] [grout] [ ]

C. Section [ ]: [Steel bar joist] [ ] metal decking [ ]

D. Section [ ]: [Metal roofing] [ ] flashing and trim [ ]

E. Section [ ]: [Joint sealers] [ ]

F. Section [ ]: [Overhead] doors [roll-up] hangar [ ]

G. Section [ ]: [Metal] [vinyl] [windows] [ ]

H. Section [ ]: [Skylights] [translucent panels] [wall lights] [ ]

I. Section [ ]: [Painting]: Finish painting [of primed steel surfaces] [ ]

J. Section [ ]: Drainage piping from downspouts to [municipal sewers] [ ]

1.3 References

[***Specifier Note:*** *Applicable standards listed below are based in part on those used in the International Building Code - 2018 Edition. List reference standards that are included within the text of this Specification.* [*Edit the following as required for project conditions.*] *If a later addendum of these standards is available, this later addendum shall be a part of this specification.*]

A. AISI S100, *North American Specification for the Design of Cold-Formed Steel Structural Members*, Washington, DC, 2016
B. AISC 360, *Specification for Structural Steel Buildings*, American Institute of Steel Construction, Chicago, IL 2016.
C. AISC, Steel Design Guide Series 3, *Serviceability Design Considerations for Steel Buildings*, Chicago, IL, Second Edition, 2003.
D. ANSI/ASHRAE/IES Standard 90.1, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, Atlanta, GA, 2016.
E. ASTM A36-14, *Standard Specification for Carbon Structural Steel*, West Conshohocken, PA.
F. ASTM A123-17, *Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products*, West Conshohocken, PA.
G. ASTM A153-16a, *Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware*, West Conshohocken, PA.

H. ASTM A307-14e1, *Standard Specification for Carbon Steel Bolts, Studs and Threaded Rod 60,000 psi Tensile Strength*, West Conshohocken, PA.
I. ASTM A325-14, *Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength*, West Conshohocken, PA.
J. ASTM A463-15, *Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process*, West Conshohocken, PA.
K. ASTM A475-03(2014), *Standard Specification for Zinc-Coated Steel Wire Strand*, West Conshohocken, PA.
L. ASTM A490-14a, *Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength*, West Conshohocken, PA.
M. ASTM A500-13, *Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes*, West Conshohocken, PA.
N. ASTM A501-14, *Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing*, West Conshohocken, PA.
O. ASTM A529-14, *Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality*, West Conshohocken, PA.
P. ASTM A572-15, *Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel*, West Conshohocken, PA.
Q. ASTM A653-17, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*, West Conshohocken, PA.
R. ASTM A792-10(2015), *Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process*, West Conshohocken, PA.
S. ASTM A1011-14, *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* West Conshohocken, PA.
T. ASTM C665-17, *Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing*, West Conshohocken, PA.
U. ASTM D1494-17, *Standard Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels*, West Conshohocken, PA.
V. ASTM E1514-98(2017)e1, *Standard Specification for Structural Standing Seam Steel Roof Panel Systems*, West Conshohocken, PA.
W. ASTM E1592-05(2017), *Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference*, West Conshohocken, PA.
X. ASTM E1646-95(2011), *Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference*, West Conshohocken, PA.
Y. ASTM E1680-16, *Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems*, West Conshohocken, PA.
Z. AWS A2.4, *Standard Symbols for Welding Brazing, and Nondestructive Examination*, Miami, FL, 1998.
AA. AWS D1.1, *Structural Welding Code - Steel*, Miami, FL, 2015.
AB. AWS D1.3, *Structural Welding Code - Sheet Steel*, Miami, FL, 2008.

AC. MBMA, *Metal Building Systems Manual*, Metal Building Manufacturers Association, Cleveland, OH, 2018.
AD. NAIMA 202, *Standard for Flexible Fiberglass Insulation to be Laminated for use in Metal Buildings*, 2000.
AE. SJI, (Steel Joist Institute) - *Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders*, 44th Edition.
AF. SSPC, (The Coatings Society) - SP2 - *Specification for Hand Tool Cleaning*, 2004 (Part of Steel Structures Painting Manual, Vol. Two)
AG. SSPC, - Paint 15 - *Steel Joist Shop Primer/Metal Building Primer*; ; 2004 (Part of Steel Structures Painting Manual, Vol. Two)
AH. SSPC, - Paint 20 - *Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic)*; Society for Protective Coatings; 1991 (Part of Steel Structures Painting Manual, Vol. Two).
AI. UL 580, - *Standard for Tests for Uplift Resistance of Roof Assemblies*, 2006 (with Revisions through July 2009).

1.4 Design Requirements

[***Specifier Note:*** *Use this Article carefully; restrict statements to identify system design requirements only. Refer to Section 2.1B and 2.2B for specification of insulation thickness.*]

A. The building shall be designed by the Manufacturer as a complete system. All components of the system shall be supplied or specified by the same manufacturer.
B. Design Code:
   Design shall be in accordance with [***Specifier Note:*** *Choose one]*
   [IBC] [ASCE 7] [applicable national or local building code] [year or edition].
C. Energy Code: [None] [IECC] [ASHRAE 90.1] [ ]

[***Specifier Note:*** *In addition to specifying the applicable energy code, the insulation requirements must be defined in Sections 2.1 and 2.2.]*

D. Risk Category: [I] [II] [III] [IV]

E. Dead Loads:
   The dead load shall be the weight of the Metal Building System and as determined by the system manufacturer.
F. Collateral Loads:
   The collateral load shall be [psf] or as shown on the contract drawings. Collateral Loads shall not be applied to the roof panels.

[***Specifier Note:*** *Collateral Loads consist of Sprinklers, Mechanical and Electrical Systems, and Ceilings.*]

G. Live Loads:
   The building system shall be capable of supporting a minimum uniform live load of [20 psf., reducible/non-reducible] [psf].

H. Snow Loads:
The design [ground] [roof] snow loads shall be [psf] or as defined on the contract drawings.

[***Specifier Note:*** *Consult specified Design Code (Section 1.4B) for additional snow factors to list, such as Exposure Factor C_e, Thermal Factor C_t & Snow Importance Factor I_S. All sources of snow drifting should be clearly identified in the contract documents, i.e. adjacent structures, site features, roof height changes, etc.*]

I. Wind Loads:
The basic design wind speed for the metal building system shall be [mph] or as defined on the contract documents.

[***Specifier Note:*** *The basic design wind speed is based on the applicable building risk category map Consult Specified Code ((Section 1.4B) for additional wind factors, such as Wind Exposure, Topographic Effects.*]

J. Seismic Loads:
Seismic load shall be determined based upon a [spectral response acceleration factors S_s, S_1] [ ].

K. Rainfall Intensity:
All exterior gutters and downspouts shall be designed for rainfall intensity based upon a 5-year recurrence interval for a five-minute duration. All interior gutters, valleys and downspouts shall be designed for rainfall intensity based upon a 25-year recurrence interval based on a five-minute duration.

[***Specifier Note:*** *Guidance on finding rainfall intensities for both 5- and 25-year rainfall can be found in the MBMA Metal Building Systems Manual, Chapter IX, Climatological Data and Information.*]

L. Deflection and drift requirements shall be in accordance with the applicable recommendations of the AISC *Steel Design Guide Series 3 - Serviceability Design Considerations for Steel Buildings* [specified building code].

[***Specifiers Note:*** *L is the span of the element between support points used for deflection limits, and H is the eave height of the building used for drift limits. For 10-year wind values, use the 10-year wind speed map that is included in ASCE 7-16 Appendix C Commentary.*]

-OR-

M. Deflections shall be limited as follows:
Primary Framing:
L/[180] [ ] for roof snow load.

Secondary Framing:

L/[150] [ ] for roof dead load + roof snow load; but not less than that required to maintain positive drainage for the greater of dead load + 1/2 roof snow load or dead load + 5 psf.
L/[150] [ ] for 10-year wind load on roof purlins.
L/[90] [ ] for 10-year wind load on wall girts.
L/[180] [ ] for roof snow load (but not less than 20 psf) on sheeting.
Metal Panels:
L/[60] [ ] for 10-year wind load on walls and roof
Drift shall be limited as follows:
[H/60], [H/100], [H/200], [H/400], [ ] for 10-year wind load.

[***Specifiers Note:*** *Refer to the IBC (Table 1604.3) for further information on deflection limits. As discussed in AISC Design Guide No.3, the drift limit is primarily selected based on the flexibility of the attached wall materials. H/60 or H/100 is common for metal wall panels but more brittle walls such as masonry, concrete or glass may require lower allowable drift limits. The proper drift limit is important or performance as well as economical framing.*

N. Thermal Effects:
Standing Seam roof panels shall be free to move in response to the expansion and contraction forces resulting from a temperature variation.
Assembly to permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of [ ] degrees F [ ] degrees C.

O. Site Conditions:
The following site features and adjacent structures must be considered in the design. Building is [ ] feet away from a [ ] wide x [ ] long x [ ] high adjacent building, as shown on drawings.

[***Specifiers Note:*** *Include other site features such as vegetation (windbreaks), embankments, escarpments, special wind regions, etc.*]

1.5 Submittals

Note: All manufacturer's drawings [and design calculations] shall bear the professional seal and signature of a licensed professional engineer registered in the state of [ ].

A. Submit anchor rod placement plan, column reactions, in advance of erection drawings.

[***Specifier Note:*** *Do not request additional submittals if Contract Documents sufficiently describe the products of this Section. Require only submittal of material which must be verified by the specifier.*]

B. Product Data: Provide data on [profiles], [component dimensions], [fasteners], [color selection], and [ ].

[***Specifier Note:*** *When manufacturer's instructions for specific installation requirements are referenced in PART 3 - EXECUTION, include the following request for submittal of those instructions. Edit the PART 3 statements to avoid conflict with Manufacturer's instructions.*]

C. Manufacturer's Installation Instructions: Indicate preparation requirements, assembly sequence, and [ ].

D. Shop or Erection Drawings: Indicate assembly dimensions, locations of structural members, connections, attachments, openings, cambers, loads, and [ ]; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation [and]; framing anchor rod settings, sizes, and locations from datum, foundation loads and [ ]; indicate field welded connections with AWS A2.4 welding symbols; indicate net weld lengths.

1.6 Quality Assurance

A. Fabricate structural steel members in accordance with MBMA *Metal Building Systems Manual*, and, for items not covered, AISC - *Specification for Structural Steel Buildings.*

1.7 Qualifications

A. Manufacturer: The company manufacturing the products specified in this Section [shall have a minimum of [ ] year[s] experience in the manufacture of metal building systems.] The metal building systems manufacturer shall be accredited under the International Accreditation Service, *Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems (AC472).*

B. Structural framing and covering shall be the design of a Registered Professional Engineer experienced in design of this work.

C. Erector shall have specialized experience in the erection of steel building systems for a period of at least [ ] years. [Erector shall be accredited under the International Accreditation Service, *Accreditation Criteria for Inspection Practices of Metal Building Assemblers (AC478)*]

[***Specifier Note:*** *Include the following section for projects involving additions to or adjacent to existing structures.*]

1.8 Field Measurements

A. [Metal building contractor] [ ] shall verify that field measurements are as indicated [in contract] [on erection drawings] [instructed by the manufacturer].

1.9 Warranty

[***Specifier Note:*** *Panel warranties generally are available to include coverage against perforations. Paint warranties generally include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking, or fading. Roof warranties may be available through the metal building contractor to include coverage for weather tightness of building enclosure elements after installation.*]

A. Building manufacturer shall provide manufacturer's standard material warranty.

-OR-

A. Building manufacturer shall provide a material warranty of [ ]year[s].

B. Metal building contractor shall provide a workmanship warranty of [ ] year[s].

1.10 Administration

A. All nomenclature shall conform to the MBMA *Metal Building Systems Manual*.

B. Coordination and administration of the work shall be in accordance with the MBMA *Metal Building Systems Manual - Chapter IV Common Industry Practices*.

Section 2 – Products

[***Specifier Note:*** *Edit the following descriptive specifications to identify project requirements.*]

2.1 Materials - Roof System

[***Specifier Note:*** *The following material listing is oriented to site assembled roof component assemblies. Manufacturer's standard fasteners must be compatible with panel material and performance level specified.*]

A. Sheet Steel Stock: [Galvanized coated to [G90] [ ] designation] [aluminum-zinc coated to [AZ55] [ ] designation] [aluminized] as required by manufacturer's design.

B. Roof Insulation: [ASTM C991], [semi-rigid] [batt] [blanket] flexible fibrous glass insulation for metal buildings type, [unfaced] [faced with a suitable vapor retarder complying with ASTM C1136] [UL flame spread classification of 25 or less and smoke developed index less than 50, where exposed in the interior], with R value of
[ ] or [ ] inches [ ] mm thick.

-OR-

Roof Insulation: [ASTM C1289, Type I] Rigid board [unfaced] [faced with reinforced foil] [UL flame spread classification of 75 or less and smoke developed index less than 450 where exposed], type as manufactured by [ ] with R value of [ ] or [ ] inches [ ] mm thick.

[***Specifier Note:*** *The required insulation for conditioned buildings may be established by the applicable energy code. If there is an applicable energy code, it should be noted in Section 1.4C.*]

C. Through Fastened Roofing: Minimum [ ] gauge [ ] inch metal thickness [ ] profile, [UL 580, Class 90 uplift rating] [lapped] [male/female] edges] [with continuous sealant.] [field applied].

-OR-

Standing Seam Roofing: Minimum [ ] gauge [ ] inch metal thickness [ ] profile, ASTM E1592 tested, [UL 580, Class 90 uplift rating] [snap seam] [mechanical seam] joining sides, with factory applied sealant.

D. Soffit Panels: Minimum [ ] gauge [ ] inch metal thickness, [flat] [ ] profile [indicated], [perforated for ventilation] [unperforated]
[ ] color [as selected from manufacturer's standard colors].

E. Closures: Manufacturer's standard type, closed cell or metal.

F. Fasteners: Manufacturer's standard type, [ ]. Size and design to maintain load and weather tightness requirements. Fasteners to be [stainless steel, head and shank] [stainless steel cap with carbon shank] [carbon steel, plated] [self tapping] [self drilling and tapping].

G. Sealant: Manufacturer's standard type.

[***Specifier Note:*** *Include H & I, if panel is to have a color finish. Note: PVDF (polyvinylidene fluoride) is a premium finish and is normally furnished at an increased cost and delivery time. Color must be specified.*

H. Exterior Surfaces of Roof Panels: Precoated steel of [polyester] [silicone polyester] [polyvinylidene fluoride (PVDF)] [ ] finish, [ ] color [as selected from manufacturer's standard colors].

I. Interior Surfaces of Roof Panels: Precoated steel with wash coat of [(polyester) (acrylic)] [silicone polyester] manufacturer's standard finish.

2.2 Materials - Wall Systems

A. Sheet Steel Stock: [Galvanized coated to [G90] [ ] designation] [aluminum-zinc]coated to [AZ55] [ ] designation] [aluminized] as required by manufacturer's design.

B. Wall Insulation: [ASTM C665] [semi-rigid], [batt] [blanket] glass fiber type, [unfaced] [faced with a suitable vapor retarder complying with ASTM C1136] [UL flame spread classification of 25 or less and smoke developed index less than 50, where exposed in the interior], with R value of [ ] or [ ] inches [ ] mm thick.

-OR-

Wall Insulation: [ASTM C1289, Type I] Rigid board [unfaced] [faced with reinforced foil] [UL flame spread classification of 75 or less and smoke developed index less than 450 where exposed], type as manufactured by [ ] with R value of [ ] or [ ] inches [ ] mm thick.

[***Specifier Note:*** *The required insulation for conditioned buildings may be established by the applicable energy code. If there is an applicable energy code, it should be noted in Section 1.4C.*]

C. Siding: Minimum [ ] gauge [ ] inch metal thickness,
[ ] profile [indicated], [ ] inch deep, [lapped] [male/female] edges.

D. Liner: Minimum [ ] gauge [ ] inch metal thickness. [flat] [perforated] profile [indicated], [lapped] [male/female] edges].

E. Closures: Manufacturer's standard type, closed cell or metal.

F. Fasteners: Manufacturer's standard type, [ ]. Size and design to maintain load and weather tightness requirements. Fasteners to be [stainless steel head and shank] [stainless steel cap with carbon shank] [carbon steel, plated] [self tapping] [self drilling and tapping].

[***Specifier Note:*** *Include G & H if panel is to have a color finish. Note: PVDF is a premium finish and is normally furnished at an increased cost and delivery time.*]

G. Exterior Surfaces of Wall Panels: Precoated steel of [[polyester] [acrylic]] [silicone polyester] [polyvinylidene fluoride (PVDF)] [ ] finish, [ ] color [as selected from manufacturer's standard colors].

H. Interior Surfaces of Wall Panels: Precoated steel with wash coat of [polyester][acrylic] [silicone polyester] manufacturer's standard finish.

2.3 Materials - Trim

A. Flashings, Internal and External Corners, Closure Pieces, [Fascia], [Infills], [Caps], and [ ]: Same material and finish as adjacent material, profile [to suit system.] [formed as detailed.] [ ] color [as selected from manufacturer's standards].

2.4 Materials - Metal Personnel Doors And Frames

[***Specifier Note:*** *Select one of the specifying methods indicated below. If the first method is used, ensure manufacturer's product criteria is accurately described.*]

Doors and frames shall be designed by their manufacturer to meet the wind load provisions as specified in Section 1.4H, and energy code requirements of Section 1.4C.

A. Building system manufacturer's standard door and frame type as shown on [plan], [schedules].

-OR-

B. Building system manufacturer's:

	Type	Size	Model No.
1.	[ ]	[ ]	Model [ ]
2.	[ ]	[ ]	Model [ ]
3.	[ ]	[ ]	Model [ ]

2.5 Materials - Doors And Frames, Other Than Personnel

[*Specifiers Note: Roll-up sheet doors and slat doors can impart in-plane tension (catenary) loading on support jambs that must be considered in their design. Other doors such as sectional doors, bifold doors, hydraulic doors, bottom rolling doors, and stack doors impart only shear and flexural loading based on their attachment schemes.*

Doors and frames shall be designed by their manufacturer to meet the wind load provisions as specified in Section 1.4H, and energy code requirements of Section 1.4B.
Metal building door support members shall be designed in a manner consistent with the load transfer mechanism employed by the door.

A. Door:

	Type	Manufacturer	Size	Model
1.	[ ]	[ ]	[ ]	Model [ ]
2.	[ ]	[ ]	[ ]	Model [ ]
3.	[ ]	[ ]	[ ]	Model [ ]

B. Door Frame: Building systems manufacturer's standard [ ].

2.6 Materials - Windows

[***Specifiers Note:*** *Select one of the specifying methods indicated below. If the first method is used, ensure manufacturer's product criteria is accurately described.*]

Windows shall be designed by their manufacturer to meet the wind load provisions as specified in Section 1.4H, and energy code requirements of Section 1.4C.

A. Building systems manufacturer's standard window and frame type as shown on [plans], [schedules].

-OR-

B. Building system manufacturer's:

	Type	Size	Model No.
1.	[ ]	[ ]	Model [ ]
2.	[ ]	[ ]	Model [ ]
3.	[ ]	[ ]	Model [ ]

2.7 Materials - Light-Transmitting Plastic Panels

A. Light-transmitting plastic roof panels shall be [ ] [clear] [white] translucent [insulated] [UL Classified] [UL Recognized Component] panels. Translucent panels shall be compatible with the steel roof panels, and shall meet the requirements of Section 1.4C. Panel shall be minimum [8] [ ] oz. per square foot and shall meet the fire properties and burning characteristics required by the applicable building code. The minimum visible light transmission shall be [40%] [60%] [ ] when measured in accordance with ASTM D1494.

B. Light-transmitting plastic wall panels shall be [ ] [clear] [white] translucent [insulated] [UL Classified] [UL Recognized Component] panels and be compatible with the steel wall panels, and shall meet the requirements of Section 1.4C. Panel shall be minimum [8] [ ] oz. per square foot and shall meet the fire properties and burning characteristics required by the applicable building code. The minimum visible light transmission shall be [40%] [60%] [ ] when measured in accordance with ASTM D1494.

2.8 Materials - Accessories

[***Specifier Note:*** *Describe ventilator type to be used; continuous ridge type, intermittent ridge type, end wall type, dampered, exhaust grilles, gravity vent, screens, operators.*]

A. Ventilator: [ ] [linear ridge] [continuous ridge] [round stationary] [ ] with [screens] [dampers] [operators].

B. Wall Louvers: [ ] type ["Z"] ["Y"] [ ] blade design, [same finish as adjacent [material] [ ], [with steel mesh [bird] [insect] screen and frame], [blank sheet

metal] [ ] at unused portions. Louvers shall be designed by their manufacturer to meet the wind load provisions as specified in Section 1.4H.

C. Provide framing for [ ] openings.

D. Curbs for HVAC equipment, skylights, hatches, etc. shall be compatible with steel roof panel and sealed against water penetration in accordance with building manufacturer's instructions. Curbs shall accommodate the expansion and contraction movement of standing seam roofs.

2.9 Fabrication - Primary Framing

A. Framing Members: Clean and prepare in accordance with SSPC-SP2 as a minimum, and [coat with primer meeting SSPC No. 15] [coat with building manufacturer's standard primer] [galvanize to ASTM A123, Class B] [supply black (unpainted)]. Note: Galvanizing may require further preparation.

B. Hot rolled members shall be fabricated in accordance with AISC Specification for pipe, tube, and rolled structural shapes.

C. Fabricate built-up members in accordance with MBMA *Metal Building Systems Manual, Chapter IV Common Industry Practices*.

2.10 Fabrication - Secondary

A. Framing Members: Clean and prepare in accordance with SSPC-SP2, as a minimum, and [coat with primer meeting SSPC No. 15] [coat with building manufacturer's standard primer] [Members formed from galvanized flat material] [galvanize to ASTM A123, Class B] [supply black (unpainted)]. Note: Galvanizing may require further preparation.

B. Cold-Formed Members: Cold-formed structural shapes shall be fabricated in accordance with MBMA *Metal Building Systems Manual, Chapter IV Common Industry Practices*.

2.11 Fabrication - Gutters, Downspouts, Flashings And Trim

A. Fabricate gutters, flashings and trims from manufacturer's standard [ ]. Color to be selected from manufacturer's standard offering.

B. Fabricate or furnish downspouts with elbows from manufacturer's standard [ ] Color to be selected from manufacturer's standard offering.

C. Form gutters and downspouts (and scuppers) of [ ] profile and size [indicated] [required by Section 1.4J] to collect and remove water. Fabricate with connection pieces.

D. Form flashing and trim sections in maximum possible lengths. Hem exposed edges. [Allow for expansion at joints].

E. Fabricate or furnish gutter support straps of manufacturer's standard material, design and finish.

F. Fabricate or furnish downspout clips or support straps of manufacturer's standard material. Finish color as selected.

Section 3 – Execution

3.1 Execution

A. Verify site conditions under provisions of Section [ ].

B. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position and properly squared.

C. Provide access to the work as scheduled for owner provided inspections, if required. The cost of any required inspections is the responsibility of the owner.

D. Do not proceed until unsatisfactory conditions have been corrected.

3.2 Erection - Framing

A. Erect framing in accordance with MBMA *Metal Building Systems Manual, Chapter IV Common Industry Practices.*

B. Use templates for accurate setting of anchor rods. When required, level bearing plate area with steel wedges, shims or grout. Check all previously placed anchorages.

C. Erect building frame true and level with vertical members plumb and bracing properly installed. Maintain structural stability of frame during erection.

D. Ream holes requiring enlargement to admit bolts. Burned holes for bolted connections are not permitted without written approval by designer. Burned holes to be reamed.

E. Tighten bolts and nuts in accordance with RCSC *Specification for Structural Joints Using High-Strength Bolts*, using specified procedure. [Snug tight] [Turn-of-the-nut tightening] [Calibrated wrench tightening] [Tension control bolts] or [Direct tension indicator washers] may be used to assure correct tightening.

F. The erector shall furnish temporary guys and bracing where needed for squaring, plumbing, and securing the structural framing against loads, such as wind loads acting on the exposed framing and seismic forces, as well as loads due to erection and erection operation, but not including loads resulting from the performance of work by others. Bracing furnished by the manufacturer for the metal building system cannot be assumed to be adequate during erection and are not to be used to pull frames into plumb condition.

The temporary guys, braces, falseworks and cribbing are the property of the erector, and the erector shall remove them immediately upon completion of erection.

G. Do not field cut or modify structural members without approval of the metal building manufacturer.

H. After erection, erector to prime welds, abrasions, and surfaces not [shop primed] [galvanized] or needing touch-up.

3.3 Erection - Wall And Roofing Systems

A. Install all wall and roofing systems in accordance with manufacturer's instructions and details.

B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.

C. Fasten cladding system to structural supports, using proper fasteners aligned level and plumb.

D. Set purlins and girts at right angle and bolt to appropriate clips. Attach to clips as required to satisfy design loads and as shown on drawings.

E. Place through-fastened roof panels at right angle to purlins and girts. Attach and plumb wall panels as shown on drawings. Maintain consistent [ ] module coverage for entire length of wall. [Predrill panels] Lap panel ends minimum [ ] inches on roof and [ ] inches on walls. Place end laps over purlins or girts. Apply manufacturer’s roof panel side and end lap sealant between panel ends and side laps to provide water-tight installation per details furnished.

F. Place Standing Seam Roof panels at right angle to purlins. Attach with sliding concealed clip where expansion and contraction must be accounted for. Lap panel ends [ ] inches as determined by manufacturer's standard and panel notch. Place end laps above purlin with backup plate [and cinch strap] so panel end-lap fasteners do not penetrate purlin. Follow manufacturer’s instructions for fastening and sealing end laps.

3.4 Erection - Gutter, Downspout, Flashings And Trim

A. Install gutters and downspouts, flashings and trim in strict accordance with manufacturer's instructions, using proper sheet metal procedures.

B. The downspout to be connected to [storm sewer system.] [ ] by plumbing contractor.

-OR-

Install downspouts to utilize splash [pans] [pads] [ ] furnished by others.

3.5 Erection - Translucent Panels

A. The translucent panels to be installed in accordance with manufacturer's instructions and details.

B. To be coordinated with installation of roofing and wall systems and related flashings and trims.

C. The installation to be made weathertight by referring to details.

3.6 Installation - Accessories

[***Specifier Note:*** *If accessories are referenced to another Section, they must be edited in that Section; delete the applicable statements below.*]

A. Install [door frame], [door], [overhead door], [window and glass], and [ ], in accordance with manufacturer's instructions.

B. All roof and wall accessories to be installed weathertight.

3.7 Tolerances

A. All work shall be performed by experienced workmen in a workmanlike manner to published tolerances.

B. Install framing in accordance with MBMA *Metal Building Systems Manual, Chapter IV Common Industry Practices.*