

Guide Specification

This Guide Specification is intended to be used in the preparation of specifications for a particular project. 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 items related to a particular project.

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SECTION 13000 - METAL BUILDING

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Design, fabricate and erect the metal building, including
 - a. Structural steel main building frames
 - b. Secondary framing including purlins and girts
 - c. Roof and wall panels and trims
 - d. Gutter and downspouts
 - e. Overhangs
 - f. Walkdoors and windows
 - g. Roof ventilators
 - h. Translucent panels
 - i. Insulation

1.02 RELATED SECTIONS

1.03 REFERENCES

- A. AISI - North American Specification for the Design of Cold-Formed Steel Structural Members - 2007 Edition
- B. ANSI/AISC 360-05 - Specification for Structural Steel Buildings, ASD 2005, 13th Edition, and Steel Design Guide Series 3 - Serviceability Design Considerations for Low-Rise Building - second edition 2003
- C. ASTM A36 - Specification for Carbon Structural Steel
- D. ASTM A325 - Specification for Structural Bolts, Steel, Heat Treated
- E. ASTM A475 - Specification for Zinc-Coated Steel Wire Strand
- F. ASTM A529 - Specification for High-Strength Carbon-Manganese Steel of Structural Quality
- G. ASTM A572 - Specification for High Strength Low-Alloy Columbium-Vanadium Steel
- H. ASTM A1011 SS or ASTM A1011HSLAS - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
- I. ASTM A792 - Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process
- J. ASTM A992 - Specification for Structural Steel Shapes
- K. ASTM D1494 - Test Method for Diffuse Light Transmission Factor of Reinforced Plastic Panels
- L. ASTM D2244 - Practice for Calculation of Color Differences from Instrumentally Measured Color Coordinates

- M. ASTM D4214 - Test Method for Evaluating the Degree of Chalking of Exterior Paint Films
- N. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials
- O. ASTM E283 - Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- P. ASTM E331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference
- Q. ASTM E1592 - Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
- R. ASTM E1646 - Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
- S. ASTM E1680 - Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems
- T. AWS A2.4 - Standard Welding Symbols
- U. AWS D1.1 - Structural Welding Code - Steel
- V. AWS D1.3 - Structural Welding Code - Sheet Steel
- W. FM4471 - Factory Mutual Research Corporation Standard 4471 Class 1
- X. IAS - International Accreditation Service, Inc.
- Y. MBMA Metal Building Systems Manual - 2006 Edition with 2010 Supplement
- Z. NAIMA 202 - Standard for Flexible Fiberglass Insulation Systems in Metal Buildings
- AA. UL 580 - Underwriters Laboratory - Tests for Uplift Resistance of Roof Assemblies
- BB. UL 790 - Underwriters Laboratory - Test Methods for Fire Tests of Roof Coverings
- CC. UL 2218 Underwriters Laboratory - Impact Resistance of Prepared Roof Covering Material
- DD. SSPC-SP2 - Steel Structures Painting Council, Surface Preparation Specification No. 2, Hand Tool Cleaning

1.04 SYSTEM DESCRIPTION

The building shall include all primary and secondary structural framing members, connection bolts, roof and wall covering, trim, fasteners, closures, sealer, canopies, roof extensions, windows, doors, skylights, insulation, gutters, downspouts, louvers, ventilators and other miscellaneous items as stated in the specifications and/or shown or called for on the drawings.

- A. Primary framing shall consist of transverse rigid frames of rafters and columns with solid webs. The rigid frame shall be fabricated of shop-welded steel plate and designed for erection by field bolting. Frames shall be:
 - a. clear span or modular with intermediate columns
 - b. gabled or single sloped
 - c. with tapered or uniform depth exterior columns.
- B. Secondary framing shall consist of purlins, girts, eave struts, flange braces and sag angles as required by design.
- C. Horizontal loads not resisted by main frame action shall be resisted by
 - a. standard cable or rod x-bracing in the roof
 - b. standard cable or rod x-bracing, rigid portal frames, or shearwall by others in the sidewalls
 - c. panel diaphragm, standard cable or rod x-bracing, rigid portal frames, or shearwall by others in the endwalls
- D. Roof and Wall System consists of preformed steel panels, trim, and accessories as required for a complete installation.
- E. Building overall dimensions, bay spacing, post spacing, eave height, clear dimensions and roof pitch shall be as indicated on the drawings and as defined here.

- a. The building "Width" shall be the measurement from outside face to outside face of the sidewall girts.
- b. The building "Length" shall be the measurement from outside face to outside face of the endwall girts.
- c. "Eave" to be determined as the line along the sidewall formed by the intersection of the planes of the roof and sidewall.
- d. "Eave Height" is defined as the vertical dimensions as measured from the finished floor to the intersection of the planes of the roof and sidewall.
- e. The "Bay Spacing" shall be the distance between the centerlines of frames for interior bays and the distance from the outside face of endwall girt to the centerline of the adjacent interior frame for end bays.
- f. The "Module Spacing" shall be measured between the centerlines of interior columns for interior modules and the distance from the outside face of sidewall girts to the centerline of the adjacent interior column
- g. "Roof Pitch" shall be the inches of vertical rise per inches of horizontal run, expressed as inches of rise per 12 inches of run.

1.05 DESIGN REQUIREMENTS

- A. Design primary and secondary structural members and exterior covering materials for applicable load and combinations of loads in accordance with the building code requested. Design loads shall be combined to produce maximum stresses within the structure in accordance with AISC and/or AISI as they apply.
- B. The design loads plus Dead Load shall be used in the structure design.
 - a. Roof Live Load shall be applied on the horizontal projection of the roof. Live Load reduction shall be applied according to the code specified above.
 - b. Wind Load shall be applied as pressure and suction in accordance with standard design criteria.
 - c. The Roof Snow Load shall be applied on the horizontal projection of the roof.
 - d. The Ground Snow Load shall be used with the exposure factor, thermal factor, slope factor and importance factor to determine the Roof Snow Load.
 - e. The metal building system shall be designed for snowdrift conditions if required based on location of the facility.
 - f. Collateral loads shall be those other than the basic design loads for which the building must be adequately designed. Loads of this type include, but shall not be limited to, suspended ceilings, sprinkler, electrical or mechanical systems, or any suspended or roof mounted HVAC units.
- C. The building components shall be designed to the following minimum deflection requirements, unless a specific deflection is required by the building code. Deflection based on wind shall be based on a 10 year map, or 75% or the design pressure for a 50 year map.
 - a. Frame rafters - $L/180$
 - b. Frame sidesway - $H/60$
 - c. Purlins - $L/150$
 - d. Girts - $L/120$
 - e. Endwall posts - $L/120$
 - f. Roof panel - $L/150$
 - g. Wall panel - $L/120$

1.06 SUBMITTALS

- A. Erection Drawings including:
 - a. Anchor rod setting plan, base plate details and column reactions
 - b. Roof framing plan
 - c. Wall framing elevations
 - d. Transverse cross sections
 - e. Panel layout
 - f. Exact location of factory located openings
 - g. Approximate location of field located openings
 - h. Framing details
 - i. Flashing details

- j. Accessory details
- B. Design calculations, stamped by a Professional Engineer registered in the state where building will be erected, including:
 - a. Stress analysis
 - b. Deflection analysis
 - c. Foundation loads for each loading case
- C. Letter of Certification, prepared and signed by a Professional Engineer, verifying that building design meets indicated loading requirements and building code as requested.

1.07 QUALIFICATIONS

- A. The company manufacturing the products specified in this Section shall:
 - a. be a member of MBMA
 - b. be in compliance with the International Accreditation Service, Inc., Accreditation Criteria for Inspection Programs for Manufactures of Metal Building Systems (IAS AC472)
 - c. have a minimum of 20 years experience in the manufacture of steel building systems
- B. Acceptable Manufacturers
 - a. Chief Buildings
- C. Erector's Qualifications
 - a. Minimum of 5 years experience in this or similar trade
 - b. Five similar installation references in past 3 years

1.08 WARRANTY

- A. The metal building manufacturer shall warrant for 5 years that components were free from defects in composition of material and workmanship and in accordance with industry standard for such components.
- B. Unpainted Galvalume® panels shall be warranted by the metal building manufacturer for 25 years against rupture, perforation, or structural failure as a result of corrosion caused by exposure to normal atmospheric conditions.
- C. The exterior silicone polyester color finish of factory coated roof panels shall be warranted by the metal building manufacturer for 25 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 7 NBS units as per ASTM D2244. Chalking shall not exceed a number 6 rating when measured per ASTM D 4214, method A.
- D. The exterior polyvinylidene fluoride (PVDF) color finish of factory coated roof panels shall be warranted by the metal building manufacturer for 35 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- E. The exterior silicone polyester color finish of factory coated wall panels shall be warranted by the metal building manufacturer for 25 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D 2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- F. The exterior polyvinylidene fluoride (PVDF) color finish of factory coated wall panels shall be warranted by the metal building manufacturer for 35 years against peeling, cracking, checking, and flaking. The panel shall not color change more than 5 NBS units as per ASTM D 2244. Chalking shall not exceed a number 8 rating when measured per ASTM D 4214, method A.
- G. Provide the owner with a copy of all warranties.

2.01 MATERIALS – STRUCTURAL FRAMING

- A. General
 - a. Structural steel members shall be sheared, plasma cut, formed, punched, welded and painted in the plant of the manufacturer. All shop connections shall be welded in accordance with the AWS "Standard Code for Welding in Building Construction".
 - b. All structural framing members shall be prepared according to SSPC-SP2 and given one shop coat of KMAA148: "VectroCoat 300 Gray" modified acrylic paint applied by Anodic Electrocoat process.
 - c. All framing members shall carry an easily visible identifying mark to aid the erector in the erection of the building.
 - d. Field connections shall be bolted with high strength bolts and nuts.
- B. Primary Structural Members
 - a. The primary structural members shall be rigid framing manufactured of solid web members having tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns.
 - b. Steel used to fabricate built up framing members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A1011, ASTM A572 or ASTM A529, Grade 55.
 - c. Steel used for interior pipe columns, if required, shall be 35,000 PSI minimum yield point material.
 - d. The building manufacturer shall have on file certified mill test reports that verify that these requirements have been met.
- C. Secondary Structural Members
 - a. Secondary structural framing shall distribute the loads to the primary structural system and shall include endwall columns and rafters, purlins, girts, eave struts, base support, headers, jambs, flange bracing, clips, and other miscellaneous structural framing.
 - b. Steel used for cold-formed members shall be 55,000 PSI minimum yield point material and shall conform to the physical characteristics of ASTM A1011 Grade 55.
 - c. Light gauge cold-formed sections shall be manufactured by precision roll or brake forming. All dimensions shall be true, and the formed member shall be free of fluting, buckling or waviness.
 - d. Endwall rafters shall be manufactured from built-up sections of adequate size and thickness as determined by the design criteria.
 - e. Endwall columns shall consist of built-up sections or cold formed "C" sections of adequate size and thickness as determined by the design criteria.
 - f. Purlins and girts shall be precision roll-formed 8" or 10" deep "C" sections or "Z" sections of adequate size and thickness as determined by the design criteria, minimum 16 gauge. Purlins and girts shall be either simple span or continuous span members.
 - g. Eave struts shall be precision roll-formed and/or press brake formed "C" sections, minimum 14 gauge. The upper flange shall slope with the normal roof slope, and the web shall be vertical and free to receive the sidewall covering.
 - h. Base support shall consist of a continuous base angle, base "C", or an 18 gauge one piece base member to which the base of the wall covering shall be attached. The base support shall be securely fastened into the concrete by the erector.
 - i. Headers and jambs shall be precision roll-formed "C" sections of the same depth as the girts.
 - j. Flange bracing shall consist of angle or tube members connected to the web of the purlin or girt and to the compression flange of the primary structural member.
 - k. Clips shall be fabricated from 55,000 PSI minimum yield point material and be factory punched for field bolted connections.

D. Bracing

- a. Horizontal load resisting bracing shall be accomplished by diagonal cable bracing, rod bracing, portal frames, and/or diaphragm action of the roof and wall covering.
- b. All cables for diagonal bracing shall be fabricated from extra high strength Grade-7 wire Class A coating, left hand lay, galvanized steel strand, conforming to the provisions of ASTM A475. Adjustment shall be provided by an eyebolt assemble.
- c. Rod bracing shall be fabricated from minimum 5/8" diameter steel rod conforming to the provisions of ASTM A36.
- d. Portal frames shall be fabricated of built-up sections and conform to the same specifications as primary framing.

2.02 MATERIALS – ROOF SYSTEM

Roof panel shall be one of the following types.

A. Ribbed roof panel

- a. Rollformed profile shall be CS (Chief Standard) configuration as manufactured by Chief Buildings. Panels shall have 1 1/8" deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".
- b. Panels shall be manufactured from 26 gauge, 80,000 PSI or 24 gauge, 50,000 PSI material.
- c. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.005 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.24 psf.
- d. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.
- e. Roof panel assemblies shall have a UL Class 30, 60, or 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- f. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".
- g. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
- h. Panels shall be one piece for slope lengths less than 39'-6". Endlaps, if required, shall be 8" and occur at a purlin.
- i. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

- i. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

- i. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with Ceram-A-Star® 1050, using ceramic and inorganic pigments over high performance primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented backing. Exterior color to be selected from Chief standard color choices.

OR

A. Standing seam roof system

- a. Rollformed profile shall be STC (Snap Tight Construction) as manufactured by Chief Buildings. Panels shall have an interlocking seam 3" deep spaced at 24" or 18" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 24" or 18".
- b. High ribs shall be sealed with factory-applied hot melt mastic and shall not require field seaming.
- c. Panels shall be manufactured from 24 gauge or 22 gauge, 50,000 PSI material.
- d. The STC roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
- e. Panels shall be one piece for slope lengths less than 51'-5". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
- f. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- g. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".
- h. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
- i. Roof system must have been tested according to the procedures in ASTM E 1592 (structural performance by uniform static air pressure differential).
- j. Panels shall be reversible end for end and no field notching shall be required.
- k. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

- k. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 - 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

A. Standing seam roof system

- a. Rollformed profile shall be MSC (Mechanically Seamed Construction) as manufactured by Chief Buildings. Panels shall have an interlocking seam 3" deep spaced at 24" or 18" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 24" or 18".
- b. High ribs shall be sealed with factory-applied hot melt mastic. The side laps shall be field seamed using a mechanical seaming device provided by the manufacturer.
- c. Panels shall be manufactured from 24 gauge or 22 gauge, 50,000 PSI material.
- d. The MSC roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
- e. Panels shall be one piece for slope lengths less than 51'-7". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
- f. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- g. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".
- h. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
- i. Roof system must have been tested according to the procedures in ASTM E 1592 (structural performance by uniform static air pressure differential).

- j. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.008 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.25 psf.
- k. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.
- l. Panels shall be reversible end for end and no field notching shall be required.
- m. The roof system shall carry a Factory Mutual Class 1 rating (Optional. Only for projects required to meet Factory Mutual wind uplift design requirements).
- n. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

- n. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 - 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

A. Standing seam roof system

- a. Rollformed profile shall be MVF (Mechanically seamed Vertical leg Flat panel) as manufactured by Chief Buildings. Panels shall have an interlocking 2" deep vertical leg spaced at 16" center. Each panel shall provide a net coverage width of 16".
- b. Side laps shall be sealed with factory-applied non-skinning, non-hardening mastic. The side laps shall be field seamed using a mechanical seaming device provided by the manufacturer.
- c. Panels shall be manufactured from 24 gauge, 50,000 PSI material.
- d. The MVF roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
- e. Panels shall be one piece for slope lengths less than 51'-4". The panel endlap, if required, shall have butyl sealant sandwiched between the top and bottom panel with a heavy gage factory applied metal backer plate.
- f. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- g. Roof system shall have been tested in accordance with the procedures in ASTM E1592 (Structural Performance by Uniform Static Air Pressure Differential).
- h. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.0026 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.25 psf.
- i. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.
- j. No field notching of panels shall be required.
- k. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

- k. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 - 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

A. Standing seam roof system

- a. Rollformed profile shall be MVP (Mechanically seamed Vertical leg Pencil-rib panel) as manufactured by Chief Buildings. Panels shall have an interlocking 2" deep vertical leg spaced at 16" center, with 3 minor pencil ribs evenly spaced between the vertical legs. Each panel shall provide a net coverage width of 16".
- b. Side laps shall be sealed with factory-applied non-skinning, non-hardening mastic. The side laps shall be field seamed using a mechanical seaming device provided by the manufacturer.
- c. Panels shall be manufactured from 24 gauge, 50,000 PSI material.
- d. The MVP roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
- e. Panels shall be one piece for slope lengths less than 52'-0". The panel endlap, if required, shall have butyl sealant sandwiched between the top and bottom panel with a heavy gage factory applied metal backer plate.
- f. Roof panel assemblies shall have a UL Class 30, 60, or 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
- g. Roof system shall have been tested in accordance with the procedures in ASTM E1592 (Structural Performance by Uniform Static Air Pressure Differential).
- h. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.0026 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.25 psf.
- i. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.
- j. No field notching of panels shall be required.
- k. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

- k. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 - 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

- A. Composite roof system, consisting of standing seam panel, bearing plates, rigid board insulation, and optional liner installed over roof purlins, as follows:
 - a. Roof panel
 - 1. Rollformed profile shall be STC (Snap Tight Construction) as manufactured by Chief Buildings. Panels shall have an interlocking seam 3" deep spaced at 24" or 18" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 24" or 18".
 - 2. High ribs shall be sealed with factory-applied hot melt mastic and shall not require field seaming.
 - 3. Panels shall be manufactured from 24 gauge or 22 gauge, 50,000 PSI material.
 - 4. The STC roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
 - 5. Panels shall be one piece for slope lengths less than 51'-5". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
 - 6. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
 - 7. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".

8. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
9. Panels shall be reversible end for end and no field notching shall be required.
10. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

10. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.
- b. Bearing plates of minimum 16 gauge steel shall be installed over rigid insulation.
- c. Rigid insulation shall be minimum 1" and maximum 4.4" thickness.
- d. Liner panel, if used, shall be 22 gauge steel, 1 1/2" panel depth, with corrugations 6" c.c., galvanized or primed gray.

OR

- d. Liner panel, if used, shall be 29 gauge steel, galvanized or painted. Ribs to be 9/16" deep with a 3/4" wide crest and spaced 2.67" c.c.

OR

- A. Composite roof system, consisting of standing seam panel, bearing plates, rigid board insulation, and optional liner installed over roof purlins, as follows:
 - a. Roof panel
 1. Rollformed profile shall be MSC (Mechanically Seamed Construction) as manufactured by Chief Buildings. Panels shall have an interlocking seam 3" deep spaced at 24" or 18" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 24" or 18".
 2. High ribs shall be sealed with factory-applied hot melt mastic. The side laps shall be field seamed using a mechanical seaming device provided by the manufacturer.
 3. Panels shall be manufactured from 24 gauge or 22 gauge, 50,000 PSI material.
 4. The MSC roof system shall have concealed clips. Clips shall be floating (sliding) to allow for thermal movement.
 5. Panels shall be one piece for slope lengths less than 51'-5". The panel endlap, if required, shall have tape sealer sandwiched between the top and bottom panel with a rigid metal backer plate.
 6. Roof panel assemblies shall have a UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".
 7. Roof panel assemblies shall have a UL Class A Fire Rating in accordance with UL 790 "Test Methods for Fire Tests of Roof Coverings".
 8. Roof panel assemblies shall have a UL Class 4 Impact Rating in accordance with UL 2218 "Impact Resistance of Prepared Roof Covering Material".
 9. Roof panel assemblies shall have permanent resistance to air leakage through assembly of not more than 0.008 cfm/sf of fixed roof area when tested according to ASTM E1680 at a static pressure differential of 6.25 psf.
 10. Roof panel assemblies shall have no water penetration as defined in the test method when tested according to ASTM E1646 at a static pressure differential of 12.0 psf.
 11. Panels shall be reversible end for end and no field notching shall be required.
 12. Panel finish shall be acrylic coated Galvalume® AZ55 coating in accordance with ASTM A792.

OR

12. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

- b. Bearing plates of minimum 16 gauge steel shall be installed over rigid insulation.
- c. Rigid insulation shall be minimum 1" and maximum 4.4" thickness.
- d. Liner panel, if used, shall be 22 gauge steel, 1 1/2" panel depth, with corrugations 6" c.c., galvanized or primed gray.

OR

- d. Liner panel, if used, shall be 29 gauge steel, galvanized or painted. Ribs to be 9/16" deep with a 3/4" wide crest and spaced 2.67" c.c.

2.03 MATERIALS – WALL SYSTEMS

- A. Exterior wall panel
 - a. Rollformed profile shall be CS (Chief Standard) **or** AP (Architectural Panel) configuration as manufactured by Chief Buildings. Panels shall have 1 1/8" deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".
 - b. Manufactured from 26 gauge or 24 gauge, 50,000 PSI material.
 - c. Wall panel assemblies (when installed with mastic in the walls) shall have permanent resistance to air leakage through assembly of not more than 0.006 cfm/sf of fixed wall area when tested according to ASTM E283 at a static pressure differential of 6.24 psf.
 - d. Wall panel assemblies (when installed with mastic in the walls) shall have no water penetration as defined in the test method when tested according to ASTM E331 at a static pressure differential of 12.0 psf
 - e. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
 - f. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

- f. Sheets shall be coated with Ceram-A-Star® 1050, using ceramic and inorganic pigments over high performance primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented backing. Exterior color to be selected from Chief standard color choices.
- g. Panels shall be one piece from base to eave for lengths less than 40'-0". Endlaps, if required, shall be 6" and occur at a girt.
- B. Liner panel, if required, shall be of same material, configuration and finish as exterior wall panel.

OR

- B. Liner panel, if required, shall be 29 gauge with a white polyester finish, rollformed to Chief's standard CS or AP profile.

2.04 MATERIALS – SOFFIT

- A. Soffit Panel
 - a. Rollformed profile shall be CS (Chief Standard) **or** AP (Architectural Panel) configuration as manufactured by Chief Buildings. Panels shall have 1 1/8" deep major ribs spaced at 12" on center, with minor ribs between major ribs. Each panel shall provide a net coverage width of 36".
 - b. Panels shall be manufactured from 26 gauge or 24 gauge, 50,000 PSI material.

- c. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
- d. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

- d. Sheets shall be coated with Ceram-A-Star® 1050, using ceramic and inorganic pigments over high performance primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented backing. Exterior color to be selected from Chief standard color choices.

OR

A. Soffit Panel

- a. Rollformed profile shall be FSP-12 (Flat Soffit Panel) configuration as manufactured by Chief Buildings. Panels shall attach to framing members using concealed fasteners. Each panel shall provide a net coverage width of 12" and have one stiffening rib.
- b. Panels shall be manufactured from 24 gauge, 50,000 PSI material.
- c. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
- d. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color shall be Polar White.

OR

A. Soffit Panel

- a. Rollformed profile shall be FSP-12 (Flat Soffit Panel) configuration as manufactured by Chief Buildings. Panels shall attach to framing members using concealed fasteners. Each panel shall provide a net coverage width of 12" and have one stiffening rib.
- b. Panels shall be manufactured from 26 gauge, 50,000 PSI material having a maximum length of 6'-0".
- c. Substrate shall be Galvalume® AZ50 coating in accordance with ASTM A792.
- d. Sheets shall be coated with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) over primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

2.05 MATERIALS – TRIM

- A. Trim shall be 26 gauge with a fluoropolymer topcoat containing not less than 70% polyvinylidene fluoride (PVDF) typical to wall panels. The reverse side shall be coated with pigmented polyester. Exterior color to be selected from Chief standard color choices.

OR

- A. Trim shall be 26 gauge with Ceram-A-Star® 1050 topcoat, using ceramic and inorganic pigments over high performance primer with total DFT of 0.8 – 1.0. The reverse side shall be coated with pigmented backing. Exterior color to be selected from Chief standard color choices.
- B. Provide all trim pieces necessary to achieve a finished appearance. Gable trim and eave trim or gutter shall have a roll formed face to maintain uniformity. Provide corner boxes to transition from gable trim to eave trim or gutter. Gutter, if required, shall have a horizontal bottom leg and the front leg shall not project above the bottom of roof panel.

- C. Provide trim at all corners of the building and for all sides of framed openings. Provide trim for base of building if required.
- D. Downspouts, if required, shall be 26 gauge with a fluoropolymer finish and shall have a minimum cross sectional area of 15.85 square inches. Downspouts shall terminate with an elbow at approximately 75° or transition to an underground drainage system.

2.06 INSULATION

- A. Roof and wall insulation shall be fiberglass rolls with 0.6 lb. per cu. ft. density, thickness as indicated, with a flame spread rating of 25 or less in accordance with ASTM E84. Insulation shall comply with NAIMA 202 Standards.

2.07 METAL PERSONNEL DOORS AND FRAMES

- A. Provide personnel doors and frame, knocked down for field assembly, as follows:
 - a. Frames shall be fabricated from 16 gauge galvanized steel, 5 3/4" depth, non-handed and reversible, with weather stripping.
 - b. Doors shall be manufactured from 18 gauge galvanized steel, 1-3/4" thick, full flush or half glass type.
 - c. Lock edge shall be square with vertical seam mechanically interlocked and have 12 gauge reinforcement for strike preparation.
 - d. Hinge edge shall be square with vertical seam mechanically interlocked and have 7 gauge reinforcing plates at 3 locations with hinge preparations.
 - e. Doors shall have 16 gauge steel, flush-mounted, top channel and inverted bottom channel.
 - f. Doors shall be prepared for cylindrical lockset (2-3/4" backset)
 - g. Door core shall be a rigid cell, foamed-in-place polyurethane with 1.8 lbs. per cubic foot density. Insulation core shall be chemically bonded to all interior surfaces, completely seal unit and produce total surface support.
 - h. Half glass doors, if required, shall have glass cutout with removable glazing bead and accommodate glass up to 1/4" thick. Glass and wet glazing are not provided.
 - i. Paint finish shall be white.
 - j. Hinges shall be 4-1/2" x 4-1/2" full mortise with non-removable pin, dull chrome finish.
 - k. Lockset shall have dull chrome finish. Entry function is key outside with turn button inside.
 - l. Threshold shall be provided in one-piece unit.
 - m. An Astragal Kit shall be provided to reduce the opening between a pair of doors and to protect the lock from tampering. A filler plate shall be provided to cover the lock preparation on the inactive leaf.
 - n. Surface Bolts shall be provided for use on inactive leaf of double doors.
 - o. Closer shall be completely non-handed with parallel arms and be UL listed.
 - p. Panic Device shall be a low profile rim-type with horizontal push bar and be UL rated. Outside handle is lever type with key entry function. Finishes shall be baked enamel for the push bar and dull chrome for the outside lever handle and trim.
- B. Provide pre-assembled personnel doors and frame as follows:
 - a. Standard doors shall be made of electrogalvanized steel sheets, 20 gauge, with smooth finish. All doors to be 1 3/4" thick with a patented two-panel design to insure structural integrity.
 - b. Doors will be fabricated rigid, neat in appearance, and free from defects, warpage, and buckle. Exposed welds to be made smooth, flush and invisible. Core is a rigid-cell, foamed-in-place polyurethane with 1.8 lbs/ft density conforming to ASTM D-

1622. Insulating core is chemically bonded to all interior surfaces, completely seals unit, and provides total support. Door core has an "R" factor of 14.97.
- c. The lock edge shall be non-beveled with a mechanical interlocking edge seam. An 18 gauge lock ring reinforcement shall be installed in the standard provision for Gov. Series 160/161 cylindrical lock sets, and in accordance with ANSI standard A 115.2.
 - d. The hinge edge is non-beveled, non-handed, and reinforced with a 7 gauge hinge reinforcement attached at each hinge location. The doors are prepared for 4 1/2" full-mortise template hinges per ANSI/SDI 100.
 - e. All doors shall have 16 gauge flush mounted top and bottom channels to prevent water penetration.
 - f. All doors shall be factory prepared with a 6 5/16" x 16" 12 gauge galvanized steel reinforcement for closer installation.
 - g. Standard frames shall be made from electrogalvanized steel sheets of 16 gauge material. Frames shall be double rabbeted. Frame stops shall be a minimum of 5/8". Standard frames shall be 4 3/4" in width with a throat size of 3 3/4".
 - h. The hinge jamb shall be reinforced with a 7 gauge plate, and prepared for a full mortise 4 1/2" template hinge. The strike jamb shall be prepared for a 4 7/8" ASA universal strike per ANSI standard A 115.2.
 - i. All doors, frame headers and frame jambs shall be thoroughly cleaned, prime coated and then top coated with a smooth, durable finish capable of passing a 200 hour salt spray test in accordance with ASTM specifications B-117 and a 500 hour humidity test in accordance with ASTM specifications D2247. Weatherometer test results - 1000 hrs. Color selection is white or bronze.
 - j. Subframing shall be factory installed to the door jambs and consist of two 16 gauge galvanized steel C-channels to match the specified girt depth.
 - k. LOCK SET shall be a commercial Grade II cylindrical lock with US26D finish having a 2 3/4" backset. Meets requirements of Federal Specifications FF-H-106H Series 160 and ANSI 4000 Grade II.
 - l. HINGES shall be (3) 4 1/2" non-removable pin template hinges with color coded finish. Meets Federal Specifications FF-H-116C and ANSI A156.1.
 - m. THRESHOLD shall be saddle type 4 3/4", factory cut, with an aluminum mill finish. Meets ADA requirements.
 - n. WEATHER STRIP shall be kerf. Factory installed to the jamb and header stops.
 - o. SWEEP shall be three finger concealed.
 - p. JAMB CLIPS shall be of 12 gauge galvanized steel.
 - q. FASTENERS shall consist of (4) 1/2" masonry anchor bolts; (25) #10 self-drilling screws; (2) masonry screws; (6) 1/4" bolts and locknuts.
 - r. Preassembled door systems shall be packaged in heavy-duty wooden crates and skidded for forklift handling.

2.08 WINDOWS

- A. Provide aluminum sliding (rolling) windows as follows:
 - a. Windows shall be aluminum insulated horizontal sliding with thermal break.
 - b. All window frames and sash members shall be of extruded aluminum alloy with minimum thickness of 0.062".
 - c. Windows shall be finished in natural aluminum extruded mill finish with Bronze acrylic electrostatically applied enamel finish.
 - d. Windows shall be factory glazed with clear 1/2" sealed insulated thermo-cell glass.
 - e. Weatherstripping shall be silicon treated, fungus, mildew and moth resistant poly bond fin seal.
 - f. Windows shall be factory equipped with an automatic lock made of non-corrosive material.

- g. Screens shall be aluminum sections securely joined at corners. Screen cloth shall be 18 x 16 mesh fiberglass or aluminum.**

2.09 TRANSLUCENT PANELS

- A. Provide translucent roof and wall panels matching Chief's CS panel configuration.**
 - a. Translucent panels shall be white and have a nominal weight of 8 oz. per square foot with 55% light transmission as per ASTM D 1494.**
 - b. Insulated translucent roof panels shall have a standard 8 oz. per square foot exterior panel with a translucent insulation foam core and a 4 oz. per square foot interior panel. The interior and exterior panels shall positively sealed with silicone sealant against air leakage and delamination. Light transmission shall be approximately 45%.**
- B. Provide translucent roof panel assemblies for STC or MSC roof system.**
 - a. Translucent panels shall be factory installed in a Chief STC or MSC panel, 2'-0" x 10'-3".**
 - b. Translucent roof panel assemblies shall have UL Class 90 uplift rating in accordance with UL 580 "Tests for Uplift Resistance of Roof Assemblies".**
 - c. Translucent panels shall be white and have a nominal weight of 8 oz. per square foot with 55% light transmission as per ASTM D 1494.**
 - d. Insulated translucent roof panels shall have a standard 8 oz. per square foot exterior panel with a translucent insulation foam core and a 4 oz. per square foot interior panel. The interior and exterior panels shall positively sealed with silicone sealant against air leakage and delamination. Light transmission shall be approximately 45%.**

2.10 ACCESSORIES

- A. Fasteners to be manufacturers standard long life fasteners. Exposed fastener heads to be factory painted to match the panel color. Self-drilling fasteners shall be used for panel to structural connections. Lapteks shall be used for panel to panel and panel to trim connections. Pop rivets shall be used at endlaps of eave and gable trims.**
- B. Closed cell foam closure strips, die cut to match CS or AP panel configuration. Metal closures shall be used with STC or MSC panel.**
- C. Mastic for roof sidelaps, endlaps, and flashings to be a non-hardening butyl tape, non-corrosive to the substrate, of 100% solids. Tape size to be minimum 3/32" x 3/4", supplied in rolls.**
- D. Caulk shall be manufacturers standard product as appropriate for the application.**
- E. Thermal blocks of expanded polystyrene shall be supplied with standing seam roof systems when required for the requested insulation thickness. The thickness of the thermal block shall be compatible with the clip height and insulation thickness.**
- F. Louvers shall be 3' x 3' self-framing and self-flashing units with insect screen. Louver frame to be minimum 18 gauge galvanized and blades to be minimum 20 gauge galvanized. Finish to be electrostatically applied polyester paint. Operator to be either hand crank or chain operator.**
- G. Continuous gravity ventilators shall have 9" or 12" throat, supplied in 10' lengths, with birdscreen. Ventilators to be of low profile design to provide gravity type ventilation. Include flashing for either single unit or continuous-run installation. 9" x 10' unit shall have a base ventilating capacity of 2700 and the 12" x 10' unit shall have a base ventilating capacity of 3600 CFM, assuming 10 degree temperature differential and 5 mph wind speed. Exterior parts to be minimum 26 gauge in Galvalume or painted galvanized. Interior parts to be G90 galvanized.**
- H. Roof curbs shall be used at all roof penetrations except pipes 13" diameter and less. Roof curb shall have a structural subframe. Curb and subframe shall be designed to support the weight of the unit. Curb shall be designed specifically for the model**

number of the roof top unit. Curb shall be supplied with rib covers and all necessary fasteners and mastic for a weathertight installation. The roof curb shall be a two piece floating curb when required by building conditions.

- I. Roof Jacks shall be used at all 13" diameter and less pipes that penetrate the roof. Roof jacks shall be EPDM with a flexible aluminum base to form a weathertight seal at the roof panel.

2.11 FABRICATION

- A. Fabricate built-up members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- B. Fabricate hot rolled members in accordance with AISC Specification for pipe, tube, and rolled structural shapes.
- C. Fabricate cold formed members in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- D. Provide factory drilled or punched framing members for field bolted connections.
- E. All framing members shall be prepared according to SSPC-SP2 and given one shop coat of KMAA148: "VectroCoat 300 Gray" modified acrylic paint applied by Anodic Electrocoat process.
- F. Clearly and legibly mark each piece to correspond with previously prepared erection drawings.

PART 3 - EXECUTION

3.01 ERECTION - FRAMING

- A. Erect framing in accordance with MBMA Low Rise Building Systems Manual, Common Industry Practices.
- B. 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 equipment 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. The temporary guys, braces, falseworks and cribbing are the property of the erector, and the erector shall remove them immediately upon completion of erection.
- C. Do not field cut or alter structural members without approval of the metal building manufacturer.
- D. After erection, prime welds, abrasions, and surfaces not shop primed.

3.02 ERECTION - WALL AND ROOFING SYSTEM

- A. Install in accordance with manufacturer's instructions.
- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.

3.03 ERECTION - GUTTER AND DOWNSPOUTS

- A. Install gutters and downspouts in strict accordance with manufacturer's instructions.
- B. Connect downspouts to storm sewer system or install splash pans.

3.04 INSTALLATION - ACCESSORIES

- A. Install accessories in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories weathertight.

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