



**BUILDINGS**

**SECTION 13 3419**

**METAL BUILDING SYSTEM**

**PART 1 GENERAL**

1.1 SUMMARY

- A. Section Includes:
1. Metal building systems including:
    - a. Metal framing components.
    - b. Metal wall panels and trim.
    - c. Metal roof panels and trim.
    - d. Metal building accessories.
- B. Related Sections:
1. Section [03 3000 - Cast-In-Place Concrete:] [\_\_\_\_ - \_\_\_\_:] Concrete slabs and footings.
  2. Section [05 1200 - Structural Metal Framing:] [\_\_\_\_ - \_\_\_\_:] Metal wall and roof framing.
  3. Section [05 4000 - Cold-Formed Metal Framing:] [09 2200 - Metal Support Assemblies:] [\_\_\_\_ - \_\_\_\_:] Metal partition wall framing.

1.2 REFERENCES

- A. American Institute of Steel Construction (AISC) - Specification for Structural Steel Buildings.
- B. American Iron and Steel Institute (AISI)- Specifications for the Design of Cold-Formed Steel Structural Members.
- C. American Welding Society (AWS)D1.1 - Structural Welding Code - Steel.
- D. ASTM International (ASTM):
1. A36/A36M - Standard Specification for Carbon Structural Steel.
  2. A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  3. A475 - Standard Specification for Zinc-Coated Steel Wire Strand.
  4. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
  5. A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
  6. A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
  7. A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  8. A792/A792M - Standard Specification for Steel Sheet, 55 Percent Aluminum-Zinc Alloy-Coated

- by Hot-Dip Process.
  - 9. A992 - Standard Specification for Structural Steel Shapes.
  - 10. A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength, Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  - 11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across Specimen.
  - 12. E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- E. International Accreditation Service (IAS) - Accreditation Procedures.
  - F. Metal Building Manufacturers Association (MBMA):
    - 1. Common Industry Practices.
    - 2. Low Rise Building Systems Manual.
  - G. Underwriters Laboratories (UL) 580 - Tests for Uplift Resistance of Roof Assemblies.

### 1.3 DEFINITIONS

- A. Traditional Metal Building System: Building system using either continuous or simple span "Z" purlins for support of roof covering material.
- B. Long Bay System (SBS): Building system using simple span, cold-formed, open web purlins to support roof covering material.
- C. Gable Symmetrical: Continuous frame building with ridge in center of building, consisting of tapered or straight columns and tapered or straight rafters. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- D. Gable Unsymmetrical: Continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. Eave height and roof slope may differ on each side of ridge. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- E. Single Slope: Continuous frame building which does not contain ridge, but consists of one continuous slope from side to side. Building consists of straight or tapered columns and tapered or straight rafters. Sidewall girts may be continuous (by-passing columns) or simple span (flush in column line). Rafters may or may not have interior columns.
- F. Lean-to (LT): Building extension, which does not contain ridge, but consists of one continuous slope from side to side, usually with same roof slope and girt design as building to which attached.
- G. Roof Slope: Pitch expressed as inches of rise for each 12 inches (300 mm) of horizontal run.
- H. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).
- I. Building Eave Height: Nominal dimension measured from finished floor to top flange of eave strut.
- J. Building Length: Measured from outside to outside of end-all secondary structural member.
- K. Acrylic-Coated Galvalume: Galvalume with light acrylic coating such as Galvalume Plus by Bethlehem, Acrylume by National or Galvalume Plus by U.S. Steel, eliminating need for roll-forming oil and reducing incidence of field marking by handling or foot traffic.
- L. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or material handling systems.

- M. Collateral Loads: Weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
- N. Dead Load: Actual weight of building system (as provided by Metal Building Company) supported by given member.
- O. Floor Live Loads: Loads induced on floor system by building occupants and possessions including but not limited to furniture and equipment.
- P. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and or movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
- Q. Roof Snow Loads: Gravity load induced by weight of snow or ice on roof, assumed to act on horizontal projection of roof.
- R. Seismic Loads: Loads acting in any direction on structural system due to action of an earthquake.
- S. Wind Loads: Loads on structure induced by forces of wind blowing from any horizontal direction.

#### 1.4 DESIGN REQUIREMENTS

- A. General:
  1. Use standards, specifications, recommendations, findings, and interpretations of professionally recognized groups as basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances.
  2. Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances govern, unless specifically required otherwise by Contract Documents.
  3. Design structures in accordance with MBMA Practices and Manual.
  4. Design structural mill sections and welded plate sections in accordance with AISC Specification.
  5. Design cold-formed steel structural members and panels will generally be designed in accordance with AISI Specification.
- B. Design Loads:
  1. In accordance with Contract Documents and manufacturer's standard design practices.
  2. Design loads include dead loads, roof live loads, wind loads, seismic loads, collateral loads, auxiliary loads, floor live loads and applied or specified loads.

#### 1.5 SUBMITTALS

- A. Submittals for Review:
  1. Shop Drawings:
    - a. Complete erection drawings with identification and assembly of building components.
    - b. Show anchor bolt settings, transverse cross-sections, sidewall, end-all, and roof framing, flashing and sheeting, and accessory installation details.
    - c. Bear seal and signature of Registered Professional Engineer responsible for system design.
  2. Product Data: Manufacturer's data sheets on each proposed product including:
    - a. Preparation instructions and recommendations.
    - b. Storage and handling requirements and recommendations.
    - c. Installation methods.
  3. Samples:
    - a. Submit color chips showing manufacturer's full range of available colors and patterns for each finish product.

b. After color selection submit samples representing actual product, color, and patterns.

B. Quality Control Submittals:

1. Design Analysis: Furnish upon request.
2. Welder certifications: As required by AWS D1.1.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer and Fabricator Qualifications: Primary products furnished by single IAS accredited manufacturer/fabricator with minimum [5] [ ] years experience.
- B. Manufacturer and Fabricator Qualifications: Primary products furnished by a Canadian A660 certified manufacturer/fabricator with minimum [5] [ ] years experience.
- C. Erector Qualifications: Single installer with minimum [5] [ ] years experience in installing products of same or similar type and scope.
- D. Mockup:
1. Size: Minimum [8 x 8] [ ] x [ ] feet ([2400 x 2400] [ ] x [ ] mm).
  2. Show metal building components, roof and wall panels, flashings, and trim.
  3. Locate [where directed.] [ ].
  4. Approved mockup may [not] remain as part of the Work.

## 1.7 PROJECT CONDITIONS

- A. Do not install systems when temperature, humidity, or ventilation are outside of limits recommended by manufacturer.

## 1.8 WARRANTIES

- A. Furnish manufacturer's 20 year warranty providing coverage against flaking, chipping, cracking, fading, or delamination of Kynar 500 or Hylar 5000 panel finish.
- B. Furnish manufacturer's 25 year warranty providing coverage against flaking, chipping, cracking, fading, or delamination of Silicon modified polyester panel finish.
- C. Furnish manufacturer's 20 year warranty providing coverage against rupture, perforation, or structural failure of aluminum-zinc alloy coated panels.
- D. Furnish manufacturer's [5] [10] [15] [20] year warranty providing coverage against water leakage through standing seam metal roof panels.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers:
1. Star Building Systems, subsidiary of NCI Building Systems, Inc. ([www.starbuildings.com](http://www.starbuildings.com))
- B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

### 2.2 MATERIALS

- A. Primary Framing Steel:
1. Hot-rolled shapes: ASTM A36/A36M or ASTM A992/A992M, minimum yield of 36 or 50 ksi.
  2. Built-up sections: ASTM A1011/A1011A, A1018, A529/A529M, A572/A572M, or A36/A36M,

- minimum yield of 42, 46, 50, or 55 ksi.
3. Pipe: ASTM A53/A53M, Grade B, minimum yield strength of 35 ksi.
  4. Round tube: ASTM A500, Grade B with minimum yield strength of 42 ksi.
  5. Square and rectangular tube: ASTM A500, Grade B, minimum yield strength of 46 ksi.
  6. Cold-formed end-all "C" sections: ASTM A1011/A1011A, Grade 55, or ASTM A653/A653M, Grade 55.
  7. X-bracing: ASTM A529/A529M, A572/A572M for rod bracing, ASTM A36/A36M for angle bracing, or ASTM A475 for cable bracing.
- B. Secondary Framing Steel:
1. Purlins, girts, and eave struts: ASTM A1011/A1011A Grade 55, or ASTM A653/A653M, Grade 55.
  2. Thickness: [16] [14] [13] [12] gage ([1.50] [1.78] [2.16] [2.67] mm).
- C. Panels:
1. UL 580, Class 90, roll-formed acrylic coated Galvalume or pre-painted Galvalume.
  2. ASTM A792/A792M, minimum yield of 50 ksi, minimum 50 percent aluminum-zinc alloy coating.
  3. ASTM A792/A792M, minimum yield of 50 ksi, minimum 55 percent aluminum-zinc alloy coating.
  4. Finish: Fluoropon coating produced with Kynar 500 or Hylar 5000 resins, [\_\_\_\_] color [to be selected from manufacturer's full color range.]
  5. Through-fastened panels:
    - a. ASTM A792/A792M, minimum yield of 50 ksi, minimum 50 percent aluminum-zinc alloy coating.
    - b. ASTM A792/A792M, minimum yield of 50 ksi, minimum 55 percent aluminum-zinc alloy coating, or 50 percent minimum aluminum-zinc alloy- coating with paint finish.
    - c. Thickness: [29] [26] [24] [22] gage ([0.338] [0.460] [0.566] [0.726] mm).
  6. Fasteners:
    - a. Through-fastened panels: Self-drilling with sealing washer.
    - b. Standing seam panels: Long life self-drilling with sealing washer.
    - c. Ridge: Long-life self-drilling with sealing washer.
    - d. Clips to purlin or bar joists: Long-life self-drilling with hex washer head and washer.
  7. Clips:
    - a. Low or high fixed clips: Use where moderate thermal expansion and contraction in roof panel is expected.
    - b. Low or high sliding clips: Provide 2 to 4 inches of travel for panel thermal expansion and contraction.
    - c. Starshield clips: provide 1-1/2 inches to 3 inches of travel for panel thermal expansion and contraction.
  8. Sealants and closures:
    - a. Sidelaps: Factory applied, hot melt, foamable mastic.
    - b. Endlaps, eave, ridge assembly, and gable flashings: Field applied, 100 percent solids butyl-based elastomeric tape sealant, in roll form or pre-cut to length.
    - c. Outside closures: 24 gage steel sheet.
    - d. Inside closures: 18 gage Galvalume or galvanized coated metal.

## 2.3 PRIMARY FRAMING

- A. Frame Type: [Rigid frame.] [\_\_\_\_.]
- B. Frame Design: As indicated on Drawings.] [Gable Symmetrical.] [Single Slope.] [Lean-to.]
- C. Sidewall Column Profile: [Tapered or Straight.] [Straight.] [As indicated on Drawings.]
- D. Frame Span: [Modular or Clear Span as indicated on Drawings.] [Modular Span as indicated on Drawings.] [Clear Span.]

- E. Modular Frame Interior Column Profile: H Shape, Round Pipe, or Tube.] [H Shape.] [Round Pipe.] [Tube Sections.] [As indicated on Drawings.]
- F. Bracing: [Standard X-Bracing or Portal Frames.] [X-Bracing.] [Portal Frames.] [Shear Walls by Ors.] [\_\_\_\_.]

## 2.4 SECONDARY FRAMING

- A. Roof Zee Purlins (Excluding Long Bay):
  1. Horizontal structural members which support roof coverings.
  2. Depth: As required by design, [8] [8-1/2] [10] [12] inches ([203] [216] [254] [305] mm) minimum.
  3. Gage: As required by design, [16] [14] [13] [12] gage ([1.50] [1.78] [2.16] [2.67] mm) minimum.
- B. Long Bay Purlins:
  1. Horizontal structural members which support roof systems with virtual square shaped top and bottom chords, and web members.
  2. Open Web Purlins for Long Bay applications.
  3. Finish: Gray primer.
- C. Wall Zee Girts:
  1. Horizontal structural members that support vertical panels.
  2. Depth: As required by design, [8] [8-1/2] [10] [12] inches ([203] [216] [254] [305] mm) minimum.
  3. Gage: As required by design, [16] [14] [13] [12] gage ([1.50] [1.78] [2.16] [2.67] mm) minimum.
- D. Spandrel Beams: Support of conventional wall systems, as required by design.

## 2.5 ACCESSORY MATERIALS

- A. Primary Framing Shop Finish: [Manufacturer's standard shop coat.] [Red oxide primer.] [Gray oxide primer.] [Hot-dip galvanized.] [\_\_\_\_.]
- B. Welding Requirements: [Standard or as required by design.] [Special seal welding.] [\_\_\_\_.]
- C. Purlin and Girt Finishes: [Manufacturer's standard finish.] [Red oxide primer.] [Gray primer.] [Pre-galvanized G90 coil stock.] [Hot-dip galvanized after forming, 14 gage minimum thickness.]
- D. Bolts - Coating and Finish: [Manufacturer's standard.] [Cadmium plated.] [Hot-dip galvanized.]

## 2.6 ROOF SYSTEMS

- A. Through-Fastened Panels:
  1. Type: Single skin ribbed panels with exposed fasteners.
  2. Panel profile: [PBR; 1-1/4 inch (32 mm) ribs at 12 inch (305 mm) centers, 1/2:12 minimum slope.] [PBU; 3/4 inch (19 mm) ribs at 6 inch (152 mm) centers, 1:12 minimum slope.] [7.2; (1-1/2 inch (39 mm) ribs at 7.2 inch centers, 1/2:12 minimum slope.)] [PBC; Corrugated 7/8 inch x 2.67 inch (22 mm x 67.5 mm) centers, 3:12 minimum roof slope.] [Dura-Rib; 1-1/8 inch (26 mm) ribs at 12 inch (305 mm) centers, 1/2:12 minimum slope.]
  3. Thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
  4. Finish:
    - a. Unpainted: [Galvalume.] [G90 galvanized.]
    - b. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
    - c. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [to be selected from metallic colors.] [\_\_\_\_.]

5. Panel fasteners: [Long-life finish.] [410 Series stainless steel.] [300 Series stainless steel.]
6. Sidelap mastic: [1 inch x 3/32 inch (25 mm x 2.4 mm).] [1/2 inch x 3/32 inch (13 mm x 2.4 mm).]

B. Standing Seam Panels:

1. Roof type: Single skin panels with concealed clips.
2. Panel profile: Double-Lok/Ultra-Dek; trapezoidal machine seamed or snap lock, 1/4:12 minimum slope.
3. Panel width: [24 inches wide x 3 inches high (610 mm wide x 76 mm high).] [24 inches wide x 3 inches high (610 mm wide x 76 mm high).] [18 inches wide x 3 inches high (457 mm wide x 76 mm high).] [12 inches wide x 3 inches high (305 mm wide x 76 mm high).]
4. Seaming type: [Snap-Lock (Ultra-Dek) or machine seamed (Double-Lok) as required by design.] [Machine seamed (Double-Lok).]

\*\*\*\* OR \*\*\*\*

5. Panel profile: Batten-Lok/Super-Lok; vertical leg architectural SSR machine seamed, 1/2:12 minimum slope.
6. Panel width: [16 inches wide x 2 inches high (406 mm wide x 51 mm high).] [12 inches wide x 2 inches high (305 mm wide x 51 mm high).]

\*\*\*\* OR \*\*\*\*

7. Panel profile: Starshield; trapezoidal machine seamed or snap lock, 1/4:12 minimum slope.
8. Panel width: 24 inches wide x 2-7/8 inches high (610 mm wide x 73 mm high).

9. Thickness: [24] [22] gage ([0.566] [0.726] mm).
10. Finish:
  - a. Unpainted: [Galvalume.] [G90 galvanized.]
  - b. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - c. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [to be selected from metallic colors.] [\_\_\_\_.]
11. Panel clips: [As required by design and insulation requirements.] [High Floating Clips.] [Low Floating Clips.]
12. Thermal spacers: [Optional.] [As Required for Insulation System.] [Required.]

C. Insulated Panels:

1. Panel profile: RWP II; 1-1/4 inch (32 mm) high ribs at 12 inch (305 mm) centers, through-fastened.
2. Exterior sheet thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
3. Interior sheet thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
4. Panel thickness: [1-1/2] [2] [2-1/2] [3] [4] [5] [6] inches ([39] [51] [64] [76] [102] [127] [154] mm).
5. Interior panel finish: [USDA White.] [\_\_\_\_.]
6. Exterior panel finish:
  - a. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - b. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [to be selected from metallic colors.] [\_\_\_\_.]

D. Insulated BattenLok Panels:

1. Panel type: Vertical leg SSR, machine seamed.
2. Panel width: [42] [36] [30] inches ([1067] [914] [762] mm).
3. Exterior sheet thickness: [24] [22] gage ([0.566] [0.726] mm).
4. Interior sheet thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).

5. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [64] [76] [102] mm).
6. Exterior panel finish:
  - a. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - b. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [to be selected from metallic colors.] [\_\_\_\_.]

E. Roof Decking:

1. Profile: [B-Deck.] [\_\_\_\_.]
2. Thickness: [22] [20] [18] gage ([0.726] [0.832] [1.024] mm) minimum.
3. Decking finish: [Prime painted gray.] [Prime painted white.] [G60 galvanized.] [G90 galvanized.]

F. Composite Roof System:

1. Standing seam roof panels over rigid insulation over decking.
2. Composite interior decking panel exposed finish: [Pre-finished white.] [Galvalume.] [\_\_\_\_.]
3. Thickness: Maximum 4 inches (102 mm) thick.
4. Composite rigid insulation: [\_\_\_\_.]

## 2.7 WALL, LINER, SOFFIT, AND FASCIA PANEL SYSTEMS

A. Application Codes:

1. WP - Exterior Wall Panels.
2. LP - Liner Panels on Interior Walls or Ceilings.
3. SP - Soffit Panels (Underside of Canopies, Purlin Extensions, Recessed Entries).
4. UP - Utility Panels (Parapet Back Panels, Substrate for Stucco/EIFS, Draft Curtains).
5. FP - Facade Panels (Facades and Equipment Screens).
6. HW - Horizontal Wall Panels (Sub-Framing and Special Detailing Required).
7. N/A - Wall Panels Are Not Required (Open Walls or Conventional Wall Construction).

B. Through-Fastened Panels:

1. Panel type: Single skin ribbed panels with exposed fasteners.
2. Panel profile: PBR; 12 inch x 1 inch (305 mm x 25 mm) Rib. 1-1/4 inch (32 mm) ribs x 12 inch (305 mm) centers.
3. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

4. Panel profile: PBR Reverse Rolled; 1-1/4 inch (32 mm) inverted ribs x 12 inch centers.
5. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

6. Panel profile: PBA; 1-1/8 inch (28.5 mm) inverted ribs x 12 inch (305 mm) centers.
7. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

8. Panel profile: PBU; 3/4 inch (19 mm) ribs x 6 inch (152 mm) centers.
9. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

10. Panel profile: PBU Reverse Rolled; 3/4 inch (19 mm) ribs x 6 inch (152 mm) centers.
11. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]



\*\*\*\* OR \*\*\*\*

- 12. Panel profile: 7.2; 1-1/2 inch (39 mm) ribs x 7.2 inch (183 mm) centers.
- 13. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

- 14. Panel profile: PBC: 7/8 inch (22 mm) corrugated x 2.67 inch (68 mm) centers.
- 15. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

- 16. Panel profile: PBD; 5/8 inch (16 mm) ribs x 2.67 inch (68 mm) centers.
- 17. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

- 18. Panel profile: Dura-Rib; 1-1/8 inch (29 mm) ribs x 12 inch (305 mm) centers.
- 19. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

- 20. Panel profile: Starmark; 1 inch (25.4 mm) inverted ribs x 12 inch (305 mm) centers.
- 21. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]

\*\*\*\* OR \*\*\*\*

- 22. Panel profile: [\_\_\_\_.]
- 23. Application Code: [WP.] [LP.] [SP.] [UP.] [HW.] [FP.] [N/A.]
- 24. Panel thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
- 25. Finish:
  - a. Unpainted: [Galvalume.] [G90 galvanized.]
  - b. Silicon modified polyester: Color [to be selected from standard colors.] [\_\_\_\_.]
  - c. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [to be selected from metallic colors.] [\_\_\_\_.]
- 26. Panel fasteners: [Long-life finish.] [Stainless steel.]

C. Concealed Fastener Panels:

- 1. Panel type: Single skin panels with concealed fasteners.
- 2. Panel profile: ShadowRib; 16 inches x 3 inches ( mm x 76 mm).
- 3. Application Code: [WP.] [FP.]

\*\*\*\* OR \*\*\*\*

- 4. Panel profile: NuWall; 12 inches x 2-1/2 inches (305 mm x 63.5 mm).
- 5. Application Code: [WP.] [FP.]

\*\*\*\* OR \*\*\*\*

- 6. Panel profile: Designer Series; 12 inches x 1-3/4 inch (305 mm x 44.5 mm) flat.
- 7. Application Code: [WP.] [FP.]

\*\*\*\* OR \*\*\*\*

8. Panel profile: Designer Series; 16 inches x 1-3/4 inches (406 mm x 44.5 mm) fluted.
9. Application Code: [WP.] [FP.]

\*\*\*\* OR \*\*\*\*

10. Panel profile: Artisan Panel; 12 inches x 1 inch (305 mm x 25 mm); soffits or interior liner only.
11. Application Code: [WP.] [SP.]

\*\*\*\* OR \*\*\*\*

12. Panel thickness:
  - a. Concealed panels: [24] [22] gage ([0.566] [0.726] mm).
  - b. Artisan panels: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
13. Panel finish:
  - a. Unpainted: [Galvalume.] [G90 galvanized.]
  - b. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - c. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from metallic colors.] [\_\_\_\_.]
14. Panel fasteners: [Long-life finish.] [Stainless steel.]

D. Through-Fastened Insulated Wall Panels:

1. Panel type: RWP II Panel; 1-1/4 inch (32 mm) high ribs at 12 inch (305 mm) centers.
2. Exterior sheet thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
3. Interior sheet thickness: [26] [24] [22] gage ([0.460] [0.566] [0.726] mm).
4. Panel thickness: [1-1/2] [2] [2-1/2] [3] [4] [5] [6] inches ([39] [51] [63.5] [76] [102] [127] [152] mm).
5. Interior panel finish: [USDA White.] [\_\_\_\_.]
6. Exterior panel finish:
  - a. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - b. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from metallic colors.] [\_\_\_\_.]

E. Insulated Concealed Fastener Panels:

1. Panel profile: FWP.
2. Panel width: 36 inches (914 mm).
3. Exterior sheet thickness: 22 gage (0.726 mm) minimum.
4. Interior sheet thickness: 26 gage (0.460 mm) minimum.
5. Exterior finish: Stucco embossed.
6. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [63.5] [76] [102] mm).
7. Face profile: Flat.

\*\*\*\* OR \*\*\*\*

8. Panel profile: IPP II.
9. Panel width: [36] [42] inches ([914] [1067] mm).
10. Exterior sheet thickness: 26 gage (0.460 mm) minimum.
11. Interior sheet thickness: 26 gage (0.460 mm) minimum.
12. Exterior finish: Stucco embossed.
13. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [63.5] [76] [102] mm).
14. Face profile: Mesa.

\*\*\*\* OR \*\*\*\*

15. Panel profile: EWP II.
16. Panel width: 36 inches (1067 mm).
17. Exterior sheet thickness: 26 gage (0.460 mm) minimum.
18. Interior sheet thickness: 26 gage (0.460 mm) minimum.
19. Exterior finish: Stucco embossed.
20. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [63.5] [76] [102] mm).
21. Face profile: Fluted.

\*\*\*\* OR \*\*\*\*

22. Panel profile: Sonora.
23. Panel width: 42 inches (1067 mm).
24. Exterior sheet thickness: 24 gage (0.566 mm) minimum.
25. Interior sheet thickness: 26 gage (0.460 mm) minimum.
26. Exterior finish: Aztec embossed.
27. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [63.5] [76] [102] mm).
28. Face profile: Flat.

\*\*\*\* OR \*\*\*\*

29. Panel profile: ESP II.
30. Panel width: [36] [42] inches ([914] [1067] mm).
31. Exterior sheet thickness: 24 gage (0.566 mm) minimum.
32. Interior sheet thickness: 26 gage (0.460 mm) minimum.
33. Exterior finish: Stucco embossed.
34. Panel thickness: [2] [2-1/2] [3] [4] inches ([51] [63.5] [76] [102] mm).
35. Face profile: Striated.

36. Interior panel finish: [USDA White.] [\_\_\_\_.]
37. Exterior panel finish:
  - a. Silicon modified polyester: Color [to be selected from standard colors.] [to be selected from cool roof colors.] [\_\_\_\_.]
  - b. Kynar 500/Hylar 5000: Color [to be selected from standard colors.] [to be selected from metallic colors.] [\_\_\_\_.]

F. Accessories:

1. Base condition:
  - a. Formed base: Pre-finished bronze, self flashing, for through-fastened panels.
  - b. Base member: [Angle.] [Channel.] [Girt.]
  - c. Base member flashing: [Drip.] [Masonry.] [As indicated on Drawings.]
2. Framed openings:
  - a. Finish: [Match girt finish.] [Pre-Galvanized.]
  - b. Framed opening trim: [Standard jamb, head, sill trim package.] [Standard trim plus full cover trim on exposed jambs and headers.]
3. Eave trim condition: [Standard gutters and downspouts.] [Low profile snow gutters and downspouts.] [Simple eave.] [Sculptured eave.]
4. Valley gutters: [\_\_\_\_.]
5. Parapet gutters: [\_\_\_\_.]
6. Trim profiles: [Manufacturer's standard profiles.] [As indicated on Drawings.]
7. Pipe flashing: [\_\_\_\_.]
8. Roof curbs: [\_\_\_\_.]

G. Roof Light Transmitting Panels (LTP): Single skin; [PBR.] [PBU.] [7.2.] [PBC.] [SSR profiles.] [Dura-Rib.]

\*\*\*\* OR \*\*\*\*

- H. Roof Light Transmitting Panels (LTP): Double skin insulated; [PBR.] [SSR profiles.]
- I. Wall Light Transmitting Panels (LTP): [PBR.] [PBA.] [PBU.] [7.2.] [PBC.] [Dura-Rib.]
- J. Roof Vents:
  - 1. Source: [By metal building system manufacturer.] [\_\_\_\_.]
  - 2. Type: [12 inches x 10 feet (305 mm x 3.05 m) ridge gravity.] [20 inch (508 mm) round gravity.] [24 inch (610 mm) round gravity.] [Include operable dampers.]
  - 3. Finish: [Unpainted Galvalume.] [Prefinished white.] [Field paint over white.] [\_\_\_\_.]
- K. Walk Doors:
  - 1. Source: [Specified in other sections.] [By metal building system manufacturer.]
  - 2. Size: [3 x 7 feet.] [4 x 7 feet.] [6 x 7 feet.] [As indicated on Drawings.]
  - 3. Elevation: [Solid.] [Narrow lite.] [Half glass.] [As indicated on Drawings.]
  - 4. Type: [Insulated.] [Non-insulated.]
  - 5. Hardware:
    - a. [Cylindrical] [Mortise] lockset.
    - b. Exit device.
    - c. Weatherstripping and threshold.
    - d. Closers.
    - e. Kick plate.
    - f. Latch guard.
    - g. Chain stops.
  - 6. Frame type: [Self framing.] [Framed openings.]
  - 7. Door assembly: [Knocked down for field assembly and glazing.] [Pre-assembled with glazing Included.]
  - 8. Glazing: [Laminated.] [Tempered.]
  - 9. Finish: [White primer.] [Bronze primer.]
- L. Louvers:
  - 1. Source: [Specified in other sections.] [By metal building manufacturer.]
  - 2. Size: [To be selected from available sizes.] [[2 x 2] [3 x 2] [3 x 3] [4 x 3] [3 x 4] [5 x 4] [\_\_ x \_\_] feet.]
  - 3. Type: [Fixed.] [Adjustable.]
  - 4. Frame type: [Self framing.] [Framed openings.]
  - 5. Finish: [Match adjacent wall color.] [\_\_\_\_.]

## 2.8 FABRICATION

- A. General:
  - 1. Shop fabricate framing members for field bolted assembly.
  - 2. Surfaces of bolted connections: Smooth and free from burrs and distortions.
  - 3. Shop connections to conform to manufacturer's standard design practices.
  - 4. Mark framing members with identifying mark.
  - 5. Welding to conform to AWS D1.1.
- B. Primary Framing:
  - 1. Plates, stiffeners, and related members.: Factory weld base plates, splice plates, cap plates, and stiffeners into place on structural members.
  - 2. Bolt holes and related machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricate webs to include bracing holes.
  - 3. Secondary structural connections (purlins and girts): Ordinary bolted connections; may include

- welded clips.
  - 4. Welding inspection: In accordance with AISC - MB category and IAS certifications.
  - 5. Non-destructive testing: Not required.
- C. Long Bay Purlins:
- 1. Fabricate purlins from cold-formed open web long bay system assemblies with stiffened chords.
  - 2. Design purlins as simple span.
  - 3. Install connection bolts through purlin seats.
  - 4. Pre-punch assemblies to allow for attachment of frame flange brace angles, compression strut extensions, and diagonal X-bridging at centerline.
  - 5. Furnish bridging as light-gage cold-formed angles secured using self-drilling fasteners.
  - 6. Manufacture sections in facility with valid MB Quality Certificate issued by American Institute of Steel Construction.
  - 7. Top and bottom chords: Nominal 4 inch (102 mm) width formed so that top surface is continuous and flat to facilitate easy assembly of roof system.
  - 8. Fabricate all elements of minimum 16 gage steel.
  - 9. Subject finished assemblies to periodic testing to loads equal to 110 percent of design loads.
- D. Zee Purlins:
- 1. Fabricate girts from cold-formed Z-shaped sections with stiffened flanges.
  - 2. Size flange stiffeners to comply with requirements of latest edition of AISI Specification.
  - 3. Purlin flanges unequal in width for easier nesting during erection.
  - 4. Purlins pre-punched at factory to provide for field bolting to rigid frames.
- E. Girts: Simple or continuous span as required by design. Connection bolts will install through webs, not flanges.
- F. Bracing:
- 1. Diagonal Bracing:
    - a. Wind bracing in roof and/or walls not required it can be shown that diaphragm strength of roof or wall covering is adequate to resist applied wind or seismic forces.
    - b. Diagonal bracing in roof and sidewalls may be used to resist longitudinal loads in structure if diaphragm action cannot be used.
    - c. Furnish to length and equipped with hillside washers and nuts at each end.
    - d. Bracing may consist of rods threaded at each end or galvanized cable with suitable threaded end anchors.
    - e. If load requirements dictate, bracing may be of structural angle or pipe, bolted in place.
  - 2. Special Bracing:
    - a. When diagonal bracing is not permitted in sidewall use rigid frame type portal or fixed base column.
    - b. Shear walls may be used where adequate to resist applied wind or seismic forces.
  - 3. Flange Braces: Brace compression flange of primary framing laterally with angles connecting to purlin or girt webs so that flange compressive stress is within allowable limits for any combination of loading.
  - 4. Bridging:
    - a. Laterally brace top chord of long bay purlins with horizontal bridging if roof system being used will not supply adequate lateral support to top chord.
    - b. Horizontally bridge bottom chord for lateral bracing. One row of bolted diagonal bridging required for long span purlins 40 feet (12 192 mm) long and longer.
- G. Standing Seam Panels;
- 1. Configure Ultra-Dek and Double-Lok panels with interlocking edges with factory applied hot-melt mastic inside female seam. Female side snaps over male side and when seamed creates continuous lock, forming 360 degree Pittsburgh seam.
  - 2. Notch Ultra-Dek and Double-Lok panels at factory at both ends so that field installation can

- commence or terminate from eir end of building.
3. Maximum panel length: 45 feet (13 716 mm) unless otherwise indicated.
- H. Endlaps:
1. Fabricate with 16 gage backup plate and eight endlap joint fasteners installed in six pre-punched holes in flat and in dimples in trapezoidal legs.
  2. Apply mastic between panels and secure with self-drilling fasteners through panels and backup plate.
  3. Through roof fasteners may be used only at endlaps and eaves.

### **PART 3 EXECUTION**

#### **3.1 PREPARATION**

- A. Clean surfaces prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for best result for substrate

#### **3.2 INSTALLATION**

- A. Install system in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Fit members square against abutting components.
- C. Position members plumb, square, and level.
- D. Temporarily brace members until permanently fastened.
- E. Do not splice load bearing members.
- F. Align and adjust various members forming parts of a complete frame or structure after assembly but before fastening.
- G. Welding to conform to AWS D1.1.
- H. Fasten panels to supports.
- I. Install trim to maintain visual continuity of system.
- J. Install joint sealers and gaskets to prevent water penetration.
- K. Flash penetrations through roofing with metal trim to match panels

#### **3.3 PROTECTION**

- A. Protect installed products until completion of project.

#### **3.4 ADJUSTING**

- A. Touch up, repair, or replace damaged products before Substantial Completion.

END OF SECTION