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ADDENDUM NUMBER: **2**

May 29, 2018

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Texas A&M Aerothermochemistry Lab Expansion  
1733 George Bush Drive W, College Station, TX 77845

Prozign Project No: 1605 PM:  
SSC Project No. 2017-02079

Architect: Prozign Architects, Inc.  
MEP Engineer: Salas O'Brien  
Structural Engineer: Scientech Engineers  
Civil Engineer: Kuo & Associates

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**NOTICE TO GENERAL CONTRACTOR:**

This Addendum forms a part of the Contract Documents and modifies the original Project Manual and drawings, issued for Competitive Sealed Proposal, Advertising dates: [IE: *Bid posted May 2<sup>nd</sup>, 2018, with Prebid : Wednesday, May 9<sup>th</sup>, 10 pm @ Project Site, and **Bid Opening: Thursday , June 14<sup>th</sup>, 2 pm @ 600 Agronomy Road, Suite 218**], to the extent noted hereinafter.*

Careful note of this addendum shall be taken by all parties of interest so that proper allowance is made in all computations, estimates and contracts and so that all trades affected are fully advised in the performance of work that will be required by them.

Items revised on the Drawings are designated by a cloud and a delta (  $\Delta$  ) surrounding the corresponding revision number or as indicated herein.

This Addendum supersedes all previous Drawings, Specification and instructions pertaining to these items. Acknowledge receipt of this Addendum by inserting its number and date in the Bid Form – Base Bid.

GENERAL

**The bid date has been moved to Thursday, June 14<sup>th</sup> at 2:00 PM**

A. PROJECT MANUAL

1. Section 01 23 00
  - a. Alternate 4 language has been amended
2. Section 09 90 00
  - a. Amended to omit the requirement to paint CMU
3. Section 13 34 19
  - a. The insulation system for the Metal Building has been amended
4. Section 13 48 40
  - a. Section has been omitted

B. ADDITIONAL ITEMS

1. Please see the attached Exhibit A for further information regarding questions submitted after Addendum #1

END OF ADDENDUM NUMBER 2

1. 13 48 00 Sound, Vibration, and Seismic Control LSM System for Concrete Floating Floor: This spec provided by add. #1 notes to provide this system were noted on the dwgs, however, no notation for it on the dwgs can be found, please confirm that it is not required. **Response: Specification to be omitted**
2. Please verify key note 10 on D1.01, provided by Add #1, to demolish lean-to structures is valid. During the prebid meeting we were advised that these were being removed prior to the start of this project. **Response: Structures will be removed before construction**
3. The response to question 12 provided in Add #1, notes for all exterior steel to have a Kynar 500 finish. Please advise if this is correct as I am not aware of Kynar 500 being applied in the field. It would need to be applied in the field due to the field welded connections at the sky-walk and the exhaust fan support. **Response: Refer to Specification 09 90 00 for exterior steel painting requirements. Color is still TBD**
4. The response to question 13 provided in Add #1 notes that no waterproofing will be required at the 12" elevator depression, however 6/P5.01 calls for a 3'x3'x3' sump pit. Please confirm the sump pit will not require below grade waterproofing. **Response: Question to be addressed in Addendum #3**
5. In the response to question 15 provided in Add #1, CMU walls were not to be painted, however spec section 09 9000 Painting provided in Add #1 calls for all CMU to be painted. Please confirm which is correct. **Response: CMU is not required to be painted, specification amended.**
6. Please confirm that conference room 209 ceiling both (gypsum furdawn and ACT) should be provided with the other finishes under alternate #1. **Response: Yes, both are in Alternate #1**
7. The response to question 26 provided in Add #1 notes that the concrete slab for the second floor will be designed by the PEMB manufacturer. However, after speaking to several of the approved PEMB suppliers, they are not able to provide the concrete slab design (depth of slab, conc. mix design, or reinforcing) for the second floor. Please provide design for the concrete slab at the second level.

**Deck shall be 1.0C24 galvanized as manufactured by VULCRAFT. (1" deck depth, gauge 24)**

**2" thick NWT concrete slab shall be used on top (total slab thickness = 3") reinforced with 6X6-W2.9XW2.9 welded wire fabric.**

**Fastening pattern of 33/4 with 5 sidelap fasteners per span shall be used.**

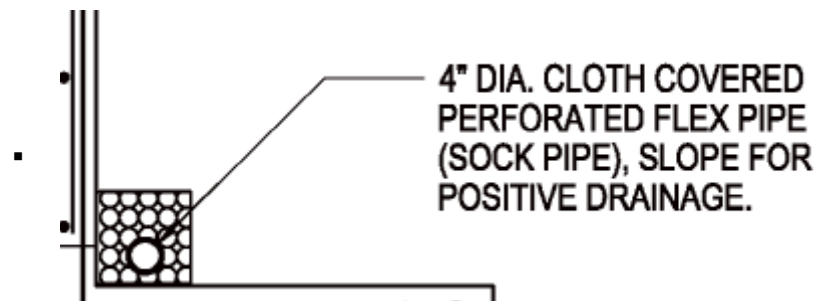
Architecture for life. SINCE 1988.

**Minimum 2 span condition shall be applied.**

**Maximum 4'-0" clear span (joist spacing) shall be used.**

**NOTE: This narrative may only be used for cost estimating purposes and shall not be used for construction. The final design pending the metal building and joist design.**

8. T3.01 notes the rough-in required for the card reader, however no rough-in details are provided for the electrified hardware at the door and door jamb. Please provide. **Response: Question to be addressed in Addendum #3**
9. The response to question 33 provided in Add #1, calls for Civil to determine the material noted as surrounding the perforated pipe. No response from the Civil Engineer could be found in Addendum #1.
  - a. Question 33 from Add #1: 4/S4.00 please provide information and spec for drainage media surrounding the perforated pipe.



**Response: Drainage media to be 3/4" pea gravel wrapped in filter fabric. Filter fabric to be non-woven geotextile with Min. AOS Sieve No. = 100, Max AOX Sieve No. = 70, Min. Weight oz./sy = 6**

10. The response to question 35 in Add #1, notes that the foundation cannot cross the TX DOT ROW, however S2.00 issued by Add #1 still shows a foundation plan crosses the ROW in the NE corner of the building. Please provide revised structural foundation plan that does not cross the ROW. **Response: Question to be addressed in Addendum #3**
11. To clarify the response to question 41 per Add #1: please verify that key note 11 on M1.01 should be fully followed as noted and that the quantity of plumbing lab gas drops to lasers is independent from the quantity of mechanical cooling drops. **Response: Yes, the quantity of plumbing lab gas drops to lasers is independent from the quantity of mechanical cooling drops. Coordinate quantities and locations with A&M prior to installation.**

12. The response to question 71 in Add #1 provided the specification for roller window shades, however no call out for locations can be determined from the drawings or the spec. Please confirm which windows are to get roller window shades.

**Response: Question to be addressed in Addendum #3**

13. In response to question 84 in Add #1 please verify that there is NO sprinkler system being provided for this facility as part of this project or outside the scope of this project, so that the irrigation meter and associated piping can be removed from base bid. **Response: There will be no irrigation in this project**

14. The response to question 84 in Add #1 regarding the SS lab gas piping was not clear:

- a. General Note 6 on P3.1 states that Gas Piping is to be ¼" Nominal Tube OD 0.248 – 0.243 in. 316 SS Sch. 80
  - ¼" x .035 tube has an OD of .25 and an ID of .18
  - ¼" Sch. 80 has an OD of .54 and an ID of .302
  - Neither of these fit the description
- b. General Note 6 and 7 refer to Orbital Welding. Tubing would be orbital welded but Sch. 80 Pipe would not be.
- c. The response to question 84 didn't clarify anything, just restated the note sizing that is trying to be clarified.

**Response: Questions to be addressed in Addendum #3**

15. Can you clarify what piping material is to be used for the Compressed Air? Spec Section 22 15 00 allows for either Type L Copper Pipe with Wrought Copper Fittings or Viega MegaPress when excepted by local code. Spec Section 22 20 00 calls for Viega MegaPress. Is the MegaPress system the preferred and allowed system for this install? **Response: Question to be addressed in Addendum #3**

16. Drawing P3.01 shows Vacuum piping to be 6" schedule 40 black steel pipe butt welded (general notes #23), will you confirm this is the correct size and material to be used? **Response: Question to be addressed in Addendum #3**

17. On page E3.01, keyed note #2, it is calling for T5 Series Starline Track Busway. This T5 series comes in multiple different amperages and the lowest amperage is 250 amp and is being fed from a 150 amp panel, please clarify the capacity of the busway. **Response: Each track is feed from a 100A/3P circuit breaker. Use Starline Track Busway T3 series rated for 100A**

18. The architectural site plan keyed note # 4 calls out for a future generator and says reference electrical. Does this item need to be addressed within the electrical drawings, as it is not shown or called out. **Response: No. There is no future generator planned for this site, will be removed from drawings in Addendum 3**
19. What is the material and detail for the bridge guardrail? Architectural drawing A2.02 references the structural drawings and the structural drawing S6.00 references the architectural. **Response: Anchorage system for guardrail is found in Structural drawings. Guardrail will be steel, architectural details will be added in Addendum #3**
20. Please confirm the 4 each piers at the skywalk are NOT belled (no bells noted in 2 & 3/S6.00). **Response: As mentioned in details 2 & 3/S6.00, the piers are "STRAIGHT DRILLED PIERS," and therefore not belled**
21. The door hardware schedule in specification 08 71 00 does not show the following doors to have hardware sets: 100E, 103E, 104A, 104B, 107, 214. Please clarify which hardware sets these doors have. **Response: Question will be addressed in Addendum #3**
22. In the revised specification 08 71 00 issued in addendum 1, the door hardware schedule shows 3 new hardware sets - 200C, 714CM, and C200S. These hardware sets do not have door types assigned to them. Please clarify. **Response: Question will be addressed in Addendum #3**
23. Drawing P3.01 shows TP-2 but does not show any piping servicing any Floor Drain or Floor Sinks. What is TP-2 servicing? **Response: Question to be addressed in Addendum #3**
24. Sequence for FCUs shows humidity control, yet no humidity sensors are shown in the drawings to be associated with the FCUs. Please confirm humidity control is required on this project. **Response: Humidity control is required and space humidity sensors shall be provided and located adjacent to each thermostat**

SECTION 01 23 00

ALTERNATES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. This Section includes administrative and procedural requirements for alternates.

1.02 RELATED SECTIONS:

- A. Section 01 10 00 - Summary of Work.
- B. Divisions 02 through Division 33: Specific sections could be affected by any Alternate.

1.03 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
- B. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
- C. Alternate bid prices shall include the cost of delivery, insurance, taxes, labor, materials, supervision, overhead, profit, incidentals and the use of all equipment and tools required to complete the specified alternate work. The alternate bid price shall constitute full compensation for work required by the alternate.

1.04 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
- B. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate. Coordinate related Work and modify surrounding Work as required to complete the Work, including changes required by each Alternate, designated in the Contract.
- C. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- D. Execute accepted alternates under the same conditions as other work of the Contract.

- E. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

1.05 DESCRIPTION OF ALTERNATES:

A. Alternate No. 1: 2nd Floor Interior Build-Out

- 1. This Alternate is for Contractor to include the amount for the 2nd Floor Interior Build-Out indicated. Include amount on Contractor's Bid Form.

B. Alternate No. 2: Isolated Combustion Room Slab

- 1. This Alternate is for Contractor to include the amount for the Isolated Combustion Room Slab indicated. Include amount on Contractor's Bid Form.

C. Alternate No. 3: Future Lab Shell Space

- 1. This Alternate is for Contractor to include the amount for the Future Lab Shell Space indicated. Include amount on Contractor's Bid Form.

**D. Alternate No. 4: Additional Utility Relocation Contract**

- 1. This Alternate is for Contractor to provide a credit amount to be applied if selected as General Contractor for both the Lab Expansion and Utility Relocation projects**

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION



**SSC SERVICES FOR EDUCATION  
COMPETATIVE SEALED PROPOSAL  
PART 1  
PROPOSAL FORM & PRICING SCHEDULE  
SECTION 00 42 13**

SSC Services for Education  
Texas A&M University, College Station, TX  
Project No.: 2017-02079  
Project Title: Aerothermochemistry Lab Expansion

\_\_\_\_\_ doing business as \_\_\_\_\_  
Business Name (Corporation, Partnership or Individual)

hereby proposes to furnish and install all work required by the Contract Documents that includes, SSC Uniform General and Supplementary Conditions ("UGSC"), SSC Special Conditions, the Drawings, the Project Manual/Specifications and any Addenda issued prior to the Proposal.

The "Total Contract Cost" shall include the cost of delivery, insurance, bonds, taxes, labor, materials, supervision, overhead, profit, incidentals and the use of all equipment and tools required to complete the work. The proposed Contract Cost, indicated in the Pricing Schedule included shall constitute full compensation for work required by the Contract Documents and the Addenda.

- The RESPONDENT certifies that this proposal is made in good faith, without collusion or connection with any other person or persons offering a proposal for the same work, and that it is made in pursuance of and subject to all the terms and conditions of the Construction Documents for the work to be accomplished, all of which have been examined by the RESPONDENT.
- All work required by the Contract Documents and enumerated in the Pricing Schedule included, whether specifically mentioned, included by implication or appurtenant thereto, shall be performed by the RESPONDENT, irrespective of whether it is named in the Pricing Schedule.
- The Proposal will remain subject to acceptance for 90 calendar days after submittal, or for such longer time as the RESPONDENT may agree to in writing upon request by the Owners Designated Representative (ODR).
- The RESPONDENT will submit a construction schedule and execute the contract within 10 business days after notification of contract award.

DESCRIPTION	TOTAL PRICE
Division 01 - General Requirements	
Division 02 - Existing Conditions	
Division 03 - Concrete	
Division 04 - Masonry	
Division 05 - Metals	
Division 06 - Wood, Plastics and Composites	
Division 07 - Thermal and Moisture Protection	
Division 08 - Openings	
Division 09 - Finishes	
Division 10 - Specialties	
Division 11 - Equipment	
Division 12 - Furnishings	
Division 13 - Special Construction	
Division 14 - Conveying Equipment	
Division 21 - Fire Suppression	
Division 22 - Plumbing	
Division 23 - Heating, Ventilating, and Air Conditioning (HVAC)	
Division 25- Integrated Automation	
Division 26 - Electrical	
Division 27 - Communications	
Division 28 - Electronic Safety and Security	
Division 31 - Earthwork	
Division 32 - Exterior Improvements	
Division 33 - Utilities	
Division 34 - Transportation	
Division 44 - Pollution Control Equipment	
Division 45 - Industry-Specific Manufacturing Equipment	
<b>BASE PROPOSAL AMOUNT</b>	

**ITEM NO. 1 - BASE PROPOSAL AMOUNT**

The amount for the complete construction of **Aerothermochemistry Lab Expansion SSC Project No. 2017-02079** (the addition of a 2 story pre-engineered metal building to existing laboratory complex, including all general, plumbing, mechanical, and electrical work indicated on the drawings Prozign Architects dated 18-04-06:

\_\_\_\_\_ Dollars \$ \_\_\_\_\_

**ALTERNATE 1 –**

*(CONTRACTOR TO INDICATE ALTERNATIVE AS AN ADD OR DEDUCT)*

ADD/DEDUCT \_\_\_\_\_ Dollars  
\$ \_\_\_\_\_

**ALTERNATE 2 –**

*(CONTRACTOR TO INDICATE ALTERNATIVE AS AN ADD OR DEDUCT)*

ADD/DEDUCT \_\_\_\_\_ Dollars  
\$ \_\_\_\_\_

**ALTERNATE 3 –**

*(CONTRACTOR TO INDICATE ALTERNATIVE AS AN ADD OR DEDUCT)*

ADD/DEDUCT \_\_\_\_\_ Dollars  
\$ \_\_\_\_\_

**ALTERNATE 4 –**

*(CONTRACTOR TO INDICATE ALTERNATIVE AS AN ADD OR DEDUCT)*

ADD/DEDUCT \_\_\_\_\_ Dollars  
\$ \_\_\_\_\_

**ADDENDA**

Respondent has received the following Addenda to the Request for Proposals, but agrees and understands that it will be responsible for performing the Work in accordance with all terms and conditions in all Addenda issued in connection with the Request for Proposals, and that its Proposal will be construed to include all requirements of all such Addenda, whether or not identified below:

Addenda No.(s) \_\_\_\_\_

**SUBSTANTIAL COMPLETION DATE**

After Commitment Approval or Notice to Proceed issued by SSC Services for Education all of the work must be substantially completed no later than \_\_\_\_ calendar days or \_\_\_\_ \_\_, 20\_\_ . Final Completion shall be achieved within 30 consecutive calendar days after the date of Substantial Completion as determined by the ODR.

The undersigned Respondent has carefully examined and considered the Project Site and relevant conditions and circumstances for the Work, information and requirements set out in the Request or Instructions for Proposals, the Drawings and Project Manual/Specifications, and the requirements of the proposed Contract Documents, including the ODR’s Agreement, the Uniform General and Supplemental Conditions, Special Conditions, and Tex.

Gov. Code pertaining to Prevailing Wages Rates, in making this Proposal. Capitalized terms used but not otherwise defined in this Proposal Form shall have the same meanings as designated in the Request for Proposals.

The undersigned Proposer further agrees to the following conditions:

1. An incomplete Proposal or one having additional information or other modifications or qualifications inscribed thereon, may be cause for rejection of the entire Proposal.
2. That, if accepted by the Owner ODR, this Proposal becomes a part to the Contract Documents upon the signing of the Contract Agreement, and failing to comply with any part of this Bid will be taken as failure of the Proposer to comply with the Contract Documents, and will be just cause for rejection of the Work.
3. That the Owner reserves the right to reject any or all Proposals and waive any or all informalities and irregularities or to accept any Proposal considered advantageous to him.

RESPONDENT:

_____	_____
Company	Employer Identification Number (EIN)
By: _____	_____
Signature	Texas HUB Certificate/VID
_____	_____
Title	Company Phone Number
_____	_____
Date	Company Email or Fax Number
_____	
Company Contact and Address for Invoice	
_____	
_____	

END OF SECTION

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions, if any, apply to this Section.

1.2 SUMMARY

- A. Section includes surface preparation and application of paints on exterior and interior substrates indicated.
- B. Related Sections: Work of all sections, including Division 01 Sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work.

1.3 DEFINITIONS

- A. Conform to definitions of terms in ASTM D16 in interpreting requirements of this Section.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Submittal Procedures".
- B. Material lists. Give the supplier's name, product name, number and generic description of each proposed product and its use. Provide product data sheets and MSDS sheets for each product. Include VOC content.
- C. Samples. Submit full range of colors, patterns, textures and finishes available for selection, including the following:
  - 1. Color Chips: Provide complete duplicate sets of color chips for color selection.
  - 2. Small Applied Samples: Provide pieces of actual material on which paint will occur with minimum dry mil thickness of specified paint. Provide painted 12 inch x 12 inch actual gypsum wallboard samples with approved textures for Architect's approval. Approved samples will become standard for which all work will be judged.
  - 3. Sheen Samples: Provide full range of varying sheens when sheens are controllable by intermixing.
- C. Installed Samples. Provide large size samples for approval. Approved samples may be left in place as part of the work.

- D. One room and/or area, as selected by the Architect, shall be painted with materials specified or accepted and applied directly from container, unthinned. After acceptance by Architect, room and/or area shall be standard of quality of entire project.
- E. Certification:
  - 1. Furnish a letter certifying that materials submitted are truly equivalent or better than those called out in the finish schedule.
  - 2. Furnish certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

#### 1.5 RESPONSIBILITY OF COORDINATION

- A. Coordinate the work specified herein with the following work:
  - 1. Provide information to preceding trades for proper preparation of substrate.
  - 2. Inspect substrate before proceeding to verify proper preparation.
  - 3. Notify Architect of any item to receive paint which may not be covered by a scheduled finish type. Architect will furnish appropriate specification.

#### 1.6 QUALITY ASSURANCE

- A. This Section outlines only minimum standards and requirements. Refer to the Drawings and other sections of the specifications for additional requirements. Bring all conflicts and discrepancies to the attention of the Architect and do not start work until such conflicts and discrepancies are clarified and corrected.
- B. Materials:
  - 1. Delivery and Storage: Products shall be delivered to jobsite in unopened containers bearing manufacturer's labels intact and legible at time of use. Storage shall be in designated areas away from excessive heat and open flames and in accordance with manufacturer's recommendations.
  - 2. Quality or Grade:
    - a. Paints and coatings shall be the manufacturer's highest professional quality material of types specified and shall be applied directly from containers in which material is purchased, except where thinning is recommended by manufacturer and approved by Architect to suit intended use, i.e. painting acoustical tile or panels without destroying their acoustical properties.
    - b. Primers and other undercoat paints shall be those produced by same manufacturer as finish coats.
    - c. Thinners shall be those recommended by paint manufacturer's printed instructions.

3. Equipment:
  - a. Spray Equipment: Shall be the type recommended for the application and shall be maintained clean and in proper working order.
  - b. Brushes, Rollers, etc.:
    - 1) Shall be new of the various sizes and types recommended for each application.
    - 2) Shall be properly cleaned and stored in accordance with manufacturer's instructions at the end of each days' use.
    - 3) Shall be replaced as often as necessary to attain the best finish quality in the Work.
  
4. Application:
  - a. Applicator:
    - 1) Shall be person(s) or entity specializing in application of paints and coatings of types specified with minimum five (5) years experience.
    - 2) Shall provide Owner and Architect a notarized certification that paint used is as specified.
  
  - b. Application:
    - 1) Shall not proceed on surfaces which are not suitable to be painted, until such surfaces have been corrected. Notify Architect in writing of which surfaces need to be corrected and their locations. Surfaces shall be corrected by the responsible trades. Surfaces not suitable for painting shall include, but not be limited to:
      - a) Damaged surfaces.
      - b) Oily, greasy, dusty or excessively soiled surfaces.
      - c) Non-dressed welds which will be exposed to view.
      - d) Lack of touch-up where specified.
      - e) Rusted or excessively deteriorated shop-prime painted surfaces.
  
    - 2) Number of coats of each of several finishes shall be in accordance with detailed specifications, which will produce first quality finish if properly applied. If number of coats specified fails to produce a finish acceptable to Architect, this Contractor shall apply additional coat or coats at his own expense until acceptable finish is achieved.

#### 1.7 PRODUCT HANDLING

- A. Use all means necessary to protect materials before, during, and after application and to protect the installed work and materials of all other trades.
  
- B. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F and 90 degrees F, unless otherwise permitted by paint manufacturer's printed instructions.

- C. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F and 95 F, unless otherwise permitted by paint manufacturer's printed instructions.
- D. Do not paint in snow, rain, fog or mist, or when relative humidity exceeds 85 percent, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

## 1.8 WARRANTY

- A. The undertaking of a painting subcontract will indicate that the subcontractor will warrant the work specified herein for two (2) years against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials and workmanship.
- B. Defects shall include by not be limited to the following:
  - 1. Discoloring noticeably by yellowing, streaking, blooming, changing color or darkening
  - 2. Mildewing
  - 3. Peeling, cracking, blistering, alligatoring or releasing from the substrate
  - 4. Chalking or dusting excessively
  - 5. Changing sheen in irregular fashion
  - 6. Softening or becoming tacky
  - 7. Bubbling

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Specifications are based on products scheduled on the Drawings or selected by the Architect or Owner from those listed below, or Architect or Owner approved equal. Other manufacturers must have a minimum of five (5) years experience manufacturing products meeting or exceeding the specifications to products specified for this Project and comply with Division 01 Section regarding Substitutions to be considered.

### 2.2 MATERIALS

- A. Paint and Coatings: Ready mixed, except for field catalyzed coatings; having good flow and brushing properties and consistent drying or curing behavior, free of sags and streaks.
- B. Stains: Interior Wood Stain (Semitransparent), water based type recommended to achieve specified color.



- C. Accessory Materials: Linseed oil, turpentine, paint thinners and other materials recommended by paint and coatings manufacturer as necessary to achieve finishes specified.
- D. Patching and Surface Preparation: Latex fillers as recommended by paint and coatings manufacturer.

### 2.3 COLORS

- A. Colors shall be as selected by Architect. Different colors may be selected for each room, and more than one color may be selected in each room.
- B. Provide colors indicated on Finish Schedule or selected by Architect.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that site environmental conditions are appropriate and substrates are in proper condition to receive Work of this Section.
- B. Verify that shop applied primers are compatible with specified finish coats.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not begin application of coatings unless moisture content of surfaces is below the following maximum values:
  - 1. Gypsum soffits: 12 percent.
  - 2. Plaster: 12 percent.
  - 3. Masonry surfaces: 12 percent.
  - 4. Wood surfaces: 15 percent.
  - 5. Vertical concrete surfaces: 12 percent.
  - 6. Horizontal concrete surfaces: 8 percent.

### 3.2 ITEMS TO RECEIVE PAINT

- A. Generally, all new items that are normally painted in any typical building, including but not limited to the following list:
  - 1. All ferrous metal
  - 2. All exterior galvanized metal
  - 3. All exterior wood
  - 4. All interior wood
  - 5. All prime coated hardware
  - 6. All exposed conduit, outlet boxes and electrical cabinets, excluding those located in mechanical rooms.
  - 7. All exposed pipe, plumbing, and ductwork, including those located in mechanical rooms.

8. All metal grilles, except aluminum, unless otherwise indicated.
  9. All exposed gypsum board surfaces, including all mechanical rooms.
  10. **CMU not required to be painted**
  11. Miscellaneous other items which normally require painting or are scheduled to be painted.
  12. Consult plans, finish schedule, details and specifications for other trades as all items usually field painted or finish will be considered as part of the Contract.
  13. All exposed structure scheduled or noted to receive paint.
- B. All work where a coat of material has been applied must be inspected and approved by Architect before application of succeeding specified coat, otherwise no credit for coat applied will be given. Notify Architect when a particular coat has been completed for inspection and approval. Apply coats of material in strict accordance with manufacturer's specifications except where requirements of these specifications are in excess of manufacturer's requirements. Paint all sight exposed pipe and plumbing only after all mechanical work and tests have been completed.

### 3.3 PREPARATION

- A. General: Surface must be clean to insure adhesion. Remove oil and grease with paint thinner. Wash off dirt with warm soapy water and rinse with clean water. Remove rust by wire brushing or sanding.
- B. Wall surfaces must be dry before painting. Verify with moisture meter.
- C. Unfinished Surfaces:
1. Wood: Sand smooth and apply one (1) coat of Primer Undercoat. After primer has dried overnight, putty nail holes and cracks, then spot-prime putty with primer. Again, allow the primer to dry overnight, sand lightly and topcoat.
  2. Masonry and Concrete: Remove efflorescence or cement dust on masonry and concrete by etching with a 10 percent solution of muriatic (Hydrochloric) acid. Flush off surface after etching with clean water, and paint while still damp. On surface where muriatic acid cannot be used to neutralize the efflorescence, remove the efflorescence by sanding, scraping or wire brushing and apply a coat of Masonry Conditioner before painting. If efflorescence is not present, no primer is necessary on concrete and masonry surfaces. Fill voids and pores in concrete and haydite blocks with Latex Block Filler and allow to dry overnight before topcoating.
  3. Iron and Steel: Prime with Metal Primer and allow to dry overnight before topcoating.
  4. Galvanized Metal: Prime with galvanized metal primer and allow to dry overnight before topcoating.

### 3.4 APPLICATION

- A. General: Surfaces to be finished must be clean, dry and free of dirt, oils, loose paint or any other contamination that would adversely affect adhesion, protective properties or appearance of the coating.
- B. Paint Thickness: Provide the following minimum dry film thickness per coat unless noted otherwise:
  - 1. Enamels on Metal: 1 mil
  - 2. Latex Paints: 1 mil
  - 3. Metal Primers: 1.5 mils
  - 4. Undercoats: 1.5 mils
  - 5. Oil Paints: 1.5 mils
  - 6. Epoxy Coating: 2.0 mils
  - 7. Thickness test: Use observation gauge that measures "V" shape scratch.
- C. Allow exterior paints to dry 72 hours between coats and interior paint to dry 24 hours between coats. Allow all enamels and varnishes to dry 24 hours between coats. If enamel and varnishes are tacky after 24 hours, allow additional time until finish is dry.
- D. Leveling: Apply with proper consistency and quality so paint flows out to a level surface free of brush and roller marks, bubbles, dust, runs, sags, and holidays. Spread evenly.
- E. Appearance: Uniform color, texture and sheen.
- F. Neatness: Paint shall not be smeared, spattered or run over adjoining colors or materials. Cut-on lines shall be straight.
- G. First coat shall be white, unless otherwise specified.

### 3.5 CLEANING AND PROTECTION

- A. Keep project premises free of painting-related debris. Collect material that may constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. Protect work adjacent to painting operations from paint spatters and spills. Immediately remove paint that falls on finished surfaces not scheduled to receive paint, using materials and techniques that will not damage affected surfaces.

### 3.6 SCHEDULE

- A. Paint items indicated on the Drawings. If not indicated, the following schedule of typical painted items shall apply, but does not specifically include every item that is to receive paint, but rather should establish type and quality of finish for all items normally included in a complete paint job.

**B. Exterior Surfaces:**

1. Steel - Unprimed:
  - a. One (1) coat of universal primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
2. Steel - Shop Primed:
  - a. Touch-up with zinc chromate primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
3. Steel - Galvanized:
  - a. One (1) coat galvanize primer.
  - b. Two (2) coats of enamel, semi-gloss.

**C. Interior Surfaces:**

1. Wood: Painted
  - a. One (1) coat of latex primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
2. Steel - Unprimed:
  - a. One (1) coat of latex primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
3. Steel - Primed:
  - a. Touch-up with latex primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
4. Steel - Galvanized:
  - a. One (1) coat galvanize primer.
  - b. Two (2) coats of latex enamel, semi-gloss.
5. Gypsum Board:
  - a. One (1) coat of latex primer sealer.
  - b. Two (2) coats of latex enamel, semi-gloss.

END OF SECTION

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions, if any, apply to this Section.

1.2 SUMMARY

- A. Section includes metal building system consisting of integrated sets of mutually dependent components including, but not limited to the following:
  - 1. Structural steel framing system.
  - 2. Pre-finished metal roof system.
  - 3. Pre-finished metal wall system.
  - 4. Faced roof and wall insulation systems.
  - 5. Pre-finished metal gutters, downspouts, and other sheet metal work associated with metal building system.
- B. Related Sections: Work of all sections, including Division 01 Sections and Drawings, as required to properly execute the work and as necessary to maintain satisfactory progress of the work.

1.3 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC)
  - 1. S326, Specifications for the Design, Fabrication and Erection of Structural Steel Buildings. (Allowable Stress Design)
- B. American Iron and Steel Institute (AISI)
  - 1. S100, Specification for the Design of Cold-Formed Structural Steel.
- C. American Welding Society (AWS)
  - 1. D1.1, Structural Welding Code-Steel (Latest Edition Unless Noted)
- D. ASTM International (ASTM)
  - 1. A36, Standard Specification for Carbon Steel.
  - 2. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
  - 3. A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

4. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
5. A475, Standard Specification for Zinc-Coated Steel Wire Strand.
6. A490, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
7. A500, Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
8. A529, Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
9. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
10. A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
11. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
12. A792, Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
13. A992, Standard Specification for Structural Steel Shapes.
14. A1011 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.
15. B117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
16. C553, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
17. C665, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
18. D523, Standard Test Method for Specular Gloss.
19. D696, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between  $-30^{\circ}\text{C}$  and  $30^{\circ}\text{C}$  with a Vitreous Silica Dilatometer.
20. D968, Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
21. D1423, Standard Test Method for Twist in Yarns by Direct-Counting.
22. D2244, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
23. D2247, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
24. D2583, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
25. D4214, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
26. E72, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
27. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
28. E94, Standard Guide for Radiographic Examination.
29. E136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at  $750^{\circ}\text{C}$ .
30. E164, Standard Practice for Contact Ultrasonic Testing of Weldments
31. E165, Standard Practice for Liquid Penetrant Examination for General Industry
32. E709, Standard Guide for Magnetic Particle Testing

- E. American Welding Society (AWS)
  - 1. D1.1, Structural Welding Code--Steel.
- F. Metal Building Manufacturers Association (MBMA)
  - 1. 01, Low Rise Building Systems Manual.
- G. Research Council on Structural Connections (RCSC)
  - 1. Specification for Structural Joints Using ASTM A325 or A490 Bolts.
- H. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA)
  - 1. Architectural Sheet Metal Manual
- I. The Society for Protective Coatings (SSPC)
  - 1. Paint 15, Steel Joist Shop Primer/Metal Building Primer.
- J. Underwriters Laboratories, Inc. (UL)
  - 1. 580, Test for Uplift Resistance of Roof Assemblies.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Division 01 Section "Substitution and Submittal Procedures".
- B. Product Data: Submit metal building system manufacturer's product information, specifications, and installation instructions for building components and accessories.
- C. Erection Drawings: Submit metal building system manufacturer's erection drawings, including plans, elevations, sections, and details, indicating roof framing, transverse cross-sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.
- D. Certification: Submit written "Letter of Certification" prepared and signed by a Professional Engineer, registered to practice in the State of Texas verifying that the metal building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.
  - 1. Certification shall reference specific dead loads, live loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, collateral loads, seismic loads, end-use categories, governing code bodies, including year, and load applications.
- E. Submit certification verifying that the metal roof system has been tested and approved by Underwriter's Laboratory as Class 90.
- F. Warranty Documentation: Submit manufacturer's standard warranty.

## 1.5 QUALITY ASSURANCE

- A. This Section outlines only minimum standards and requirements. Refer to the Drawings and other sections of the specifications for additional requirements. Bring all conflicts and discrepancies to the attention of the Architect/Engineer and Owner, and do not start work until such conflicts and discrepancies are clarified and corrected.
- B. Manufacturer's Qualifications:
  - 1. Manufacturer regularly engaged, for past ten (10) years, in manufacture of metal building systems of similar type to that specified.
  - 2. Accredited based on IAS Accreditation Criteria AC472 and requirements in International Building Code (IBC), Chapter 17.
- C. Installer's Qualifications:
  - 1. Installer regularly engaged, for past five (5) years, in installation of metal building systems of similar type to that specified.
  - 2. Employ persons trained for installation of metal building systems.
- D. Certificate of design and manufacturing conformance.
- E. Material Test Reports:
  - 1. In addition to material certifications of structural steel, metal building system manufacturer shall provide, upon request at time of order, evidence of compliance with specifications through testing.
  - 2. This quality assurance testing shall include testing of structural bolts, nuts, screw fasteners, mastics, and metal coatings (primers, metallic coated products, and painted coil products).

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in accordance with manufacturer's instructions.
  - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
  - 3. Do not store materials directly on ground.
  - 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
  - 5. Protect materials and finish during storage, handling, and installation to prevent damage.



## 1.7 WARRANTY

### A. Class III Weathertightness Warranty:

1. Manufacturer's 20 year no dollar limit weathertightness warranty which covers the entire roof system.
2. Although the warranty covers the entire roof system there are provisions in the warranty which exclude any roof accessories which are not supplied by manufacturer. Manufacturer cannot be liable for the products which are placed on the roof without having strict requirements and guidelines for installation of such accessories. Therefore, if this warranty is required manufacturer must supply all required roof accessories in order to investigate claims associated with deficiencies in these areas.
3. Liability, as combined to specified manufacturer and our customer is limited to the actual cost of the repair work.

### B. One Year Workmanship Warranty:

1. This warranty provides additional reassurance that specified manufacturer stands behind our products warranting the workmanship of the materials manufactured by specified manufacturer for a period of one year from date of substantial completion.
2. This warranty is supplied at no cost to our customer.

### C. Finish Warranties:

1. These warranties are "pass through" warranties in that manufacturer is only able to supply these because the raw material manufacturer (steel mill) or coil paint manufacturer (Akzo Nobel) is willing to warrant their product to this extent.
2. Manufacturer does not typically extend these warranties beyond what the steel mill or Akzo Nobel allows as manufacturer cannot accept sole liability beyond their standard limits.
3. These warranties are supplied at no cost to our customer.

## PART 2 - PRODUCTS

### 2.1 APPROVED MANUFACTURERS

#### A. Specifications are based on named products and manufacturers, or Architect/Engineer approved equal. Other manufacturers must comply with Manufacturer's Qualifications paragraph in Quality Assurance article and comply with Division 01 requirements regarding substitutions to be considered.

1. Metal Building: Whirlwind Steel Buildings & Components, Houston, Texas; (877) 787-2350.
2. Metal Wall and Roof Panels: Whirlwind Steel Buildings & Components, Houston, Texas; (877) 787-2350.
3. Wall and Roof Insulation:
  - a. **Energy Saver FP system manufactured by GBP Silvercote, Solon, Ohio (800) 231-6200**

- b. **Knauf Silvercote Metal Building Insulation manufactured by Knauf Building Products, Inc., Shelbyville, Indiana; (317) 398-4434.**

## 2.2 BUILDING DESCRIPTION

- A. Building Dimensions: Indicated on the Drawings.
  1. Horizontal Dimensions: Measure to inside face of wall sheets.
  2. Eave Height: Measure from top of finished floor to intersection of insides of roof and sidewall sheets.
  3. Clear Height Between Finished Floor and Bottom of Roof Steel: Indicated on the Drawings.
- B. Primary Structural Members:
  1. Primary Framing System: Specified manufacturer's framing system as specified in this specification section.
  2. Frames: Welded-up plate section columns and roof beams, complete with necessary splice plates for bolted field assembly as specified in this specification section.
  3. Bolts for Field Assembly of Primary Steel: High-strength bolts as indicated on erection drawings of metal building system manufacturer.
  4. Beam and Post Endwall Frames: Endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
  5. Exterior Columns: Welded-up "H" sections or cold-formed "C" sections.
  6. Interior Columns: "H" sections or tube columns.
  7. Connection of Primary Structural Members: ASTM A 325 bolts through factory-punched holes.
  8. Primary Structural Members: Paint with metal building system manufacturer's standard primer with surface preparation as specified in this specification section.
- C. Secondary Structural Members:
  1. Secondary Framing System: Specified manufacturer's framing system as specified in this specification section.
  2. C/Z Purlins and Girts.
- D. Metal Roof System: Specified metal roof system specified in this specification section.
- E. Metal Wall System: Specified metal wall system specified in this specification section.
- F. Where metal panels are required to be painted, use coating system as specified in this specification section.

## 2.3 DESIGN LOADS

- A. Governing Design Code:
  - 1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:
    - a. Governing Building Code: International Building Code with applicable local amendments.
    - b. Year/Version: 2015.
- B. Roof Live Load: Refer to Structural Drawings.
  - 1. Roof live loads are loads produced during the life of the structure by moveable objects.
  - 2. Wind, snow, seismic, or dead loads are not live loads.
  - 3. Roof live loads are applied based on the Tributary Area as follows:
    - a. 0 to 200 Square Feet: 20 psf.
    - b. 201 to 600 Square Feet: Interpolation between 200 sq ft and 600 sq ft numbers.
    - c. 601 Square Feet or Greater: 12 psf.
- C. Risk Category III-IV: 120 mph.
- D. Wind Condition: Enclosed.
- E. Snow Exposure: 1.00
- F. Seismic Load: Seismic Zone A, unless indicated on Structural Drawings.
- G. Dead Load: Dead load shall consist of the weight of building system construction, such as roof, framing, and covering members.
- H. Collateral Load:
  - 1. Collateral load of five (5) pounds per square foot shall be applied to the entire structure to account for the weight of additional permanent materials other than the building system, such as sprinklers, mechanical systems, electrical systems, hung partitions, and ceilings.
  - 2. This allowance does not include the weight of hung equipment weighing 50 pounds or more.
  - 3. Equipment loads of 50 pounds or more shall be indicated on the Drawings and the structure shall be strengthened as required.
  - 4. Architect/Engineer will provide the metal building system manufacturer with the magnitude and approximate location of concentrated loads greater than 50 pounds before design of the building starts.
- I. Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents.

- J. Load Combinations: Load combinations used to design primary and secondary structural members shall be in accordance with the governing code.

## 2.4 DEFLECTIONS

- A. L/120, for lateral drift or vertical deflection, unless indicated otherwise on Structural Drawings for deflection criteria.

## 2.5 STRUCTURAL STEEL FRAMING SYSTEM

### A. General:

1. Design of Structural System: Clear or multi-span rigid frame with straight columns and roof beams, with gable or single-slope roof.
2. Actual Building Length:
  - a. Structural line to structural line.
  - b. Same as nominal; i.e., number of bays times length of bays.
  - c. Structural Line: Defined as inside face of wall sheets.
3. Actual Building Width:
  - a. Structural line to structural line.
  - b. Nominal building width.
4. Minimum Roof Slope: 1/2 inch in 12 inches.
5. Maximum Roof Slope: 2 inches in 12 inches.
6. Components and Parts of Structural System:
  - a. Indicated on the Drawings or the Specifications.
  - b. Clearly marked.
  - c. Erection Drawings: Supply for identification and assembly of parts.
  - d. Drawings: Carry stamp of a registered professional engineer.
7. Foundations:
  - a. Foundations, Including Anchor Bolt Embedment Length: Properly designed by qualified engineer, retained by other than metal building system manufacturer, in accordance with specific soil conditions for building site.
  - b. Reactions for Proper Design of Foundations: Supplied by metal building system manufacturer.
  - c. Anchor Bolts:
    - 1) Anchor Bolt Diameter: Indicated on anchor bolt layout drawings furnished by metal building system manufacturer.
    - 2) Anchor Bolts: Supplied by Contractor, not metal building system manufacturer.
    - 3) Anchor Bolts on Moment-Resisting Column Bases: Nuts above and below base plates.

**B. Structural Steel Design:**

1. Structural Mill Sections or Welded-up Plate Sections: Design in accordance with AISC Specification for Structural Steel Buildings.
2. Cold-Formed Steel Structural Members: Design in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
3. Structural System: Design in accordance with specified building code (Refer to Design Loads and Building Codes).

**C. Primary Framing:**

1. Rigid Frames:
  - a. Frames: Welded-up plate section columns and roof beams, complete with necessary splice plates for bolted field assembly.
    - 1) Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes factory fabricated.
    - 2) Columns and Roof Beams: Fabricated complete with holes in webs and flanges for attachment of secondary structural members and bracing, except for fieldwork as noted on erection drawings furnished by metal building system manufacturer.
  - b. Bolts for Field Assembly of Frame Members: ASTM A 325 high-strength bolts as indicated on erection drawings furnished by metal building system manufacturer.
2. Endwall Structural Members: Cold-formed channel members designed in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members or welded-up plate sections designed in accordance with AISC Specification for Structural Steel Buildings.
  - a. Endwall Frames: Endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
    - 1) Splice Plates and Base Clips: Shop fabricated complete with bolt connection holes.
    - 2) Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes shop fabricated.
    - 3) Beams and Posts: Factory fabricated complete with holes for attachment of secondary structural members, except for field work as noted on erection drawings furnished by metal building system manufacturer.
  - b. Intermediate Frames: Substituted for end-wall roof beams, when specified.
  - c. Factory fabricate necessary endwall posts and holes for connection to intermediate frame used in endwall.

D. Secondary Structural Members:

1. Purlins:

a. Purlins:

- 1) "Z"-shaped, precision-roll-formed, in different gauges to meet specified loading conditions.
- 2) 8-inch, 10-inch, or 12-inch-deep "Z" sections as indicated or required.

- b. Outer Flange of Purlins: Factory-punched holes for panel connections.
- c. Attach purlins to main frames and endwalls with 1/2-inch-diameter bolts.
- d. Brace purlins at intervals indicated on erection drawings furnished by metal building system manufacturer.
- e. Concentrated Loads: Hung at purlin panel points.

2. Eave Members:

- a. Eave Struts: Factory punched, 8-inch, 10-inch, or 12-inch-deep "C" sections, precision-roll-formed, in different gauges to meet specified loading conditions.

3. Girts:

- a. "Z" or "C"-shaped, precision-roll-formed, in different gauges to meet specified loading conditions.
- b. 8-inch, 10-inch, or 12-inch-deep "Z" or "C" sections.
- c. Outer Flange of Girts: Factory-punched holes for panel connections.

4. Bracing:

- a. Locate bracing as indicated on the Drawings.
- b. Diagonal Bracing:
  - 1) Cable Bracing conforming to ASTM A475-78 for extra high strength grade or
  - 2) Structural Angle Bracing or
  - 3) Hot-rolled rods of sizes indicated on the Drawings.
  - 4) Attach to columns and roof beams as indicated on the Drawings.
- c. Optional fixed-base wind posts or pinned-base portal frames may be substituted as required.
- d. Flange Braces and Purlin Braces: Cold formed and installed as indicated on the Drawings.

E. Welding:

1. Welding Procedures, Operator Qualifications, and Welding Quality Standards: AWS D1.1 - Structural Welding Code - Steel and AWS D1.3 - Structural Welding Code - Sheet Steel.
2. Welding inspection, other than visual inspection as defined by AWS D1.1, paragraph 6.9, shall be identified and negotiated before bidding.
3. Certification of Welder Qualification: Supply when requested.

F. Painting of Structural Steel Framing System:

1. General:
  - a. Structural Steel: Prime paint as temporary protection against ordinary atmospheric conditions.
  - b. Perform subsequent finish painting, if required, in field as specified in the painting section.
  - c. Before painting, clean steel of loose rust, loose mill scale, dirt, and other foreign materials.
  - d. Steel Fabricator: Not required to sand blast, flame clean, or pickle steel before painting, unless otherwise specified.
2. Primary Frames:
  - a. Clean steel in accordance with SSPC-SP2.
  - b. Factory cover steel with 1 coat of manufacturer's standard gray primer paint formulated to equal or exceed Federal Specification TTP-664
  - c. Minimum Dry Film Thickness: 1.0 mil.
3. Secondary Structural Members - Roll-Formed:
  - a. Pre-coated cold form material by commercial coater using a preparation process equal to SSPC-SP10.
  - b. Minimum Dry Film Thickness: 0.5 mil.

2.6 METAL ROOF PANEL SYSTEM

- A. Snap lock, concealed clip, full trapezoidal profile, standing seam roof panel with the following characteristics:
1. Coverage Width: 24 inches
  2. Minimum Slope: 1/4:12
  3. Panel Attachment: Low, high (fixed, floating).
  4. Panel Substrate: Galvalume<sup>®</sup>
  5. Gauge: 24
  6. Coatings: Kynar 500.
  7. Color: Match existing.
  8. Approved Product: Super Seam-Plus manufactured by Whirlwind Steel Buildings & Components, Houston, Texas; (877) 787-2350, or Architect approved equal in accordance with Paragraph 2.1.

2.7 METAL WALL PANEL SYSTEM

- A. Exposed fastener panel with the following characteristics:
1. Coverage Width: 36 inches
  2. Rib Spacing: 12 inches
  3. Rib Height: 1-1/4 inches
  4. Panel Attachment: Exposed Fastening System
  5. Gauge: 24
  6. Coatings: Kynar 500.

7. Color: Match existing.
8. Approved Product: Super Span X manufactured by Whirlwind Steel Buildings & Components, Houston, Texas; (877) 787-2350, or Architect approved equal in accordance with Paragraph 2.1

## 2.8 ROOF AND WALL TRIM AND FLASHINGS

- A. Materials used in the fabrication of metal building manufacturer's architectural roof and wall trim and flashing shall be a prefinished Kynar 500 finish over 24 gage, Grade 50 Aluminum-Zinc alloy-coated steel substrate, ASTM A792, coating designation AZ50 or AZ55.

## 2.9 FASTENERS

- A. Fasteners for roof and wall covering systems shall be one or more types of self-drilling or self-tapping screws. Blind rivets shall be used in trim and accessory attachment and trim splicing.

## 2.10 FABRICATION

- A. Structural members shall be fabricated by shearing, flame cutting, forming, welding, punching, drilling, reaming, etc., as required in accordance with metal building manufacturer's standard practices.
  1. Welded plate members fabricated from plate or bar stock materials shall have flanges and webs joined on the one side of the web by a submerged arc continuous weld process.
  2. Shop connections for built-up and/or hot-rolled members shall normally be welded using either a submerged or gas metal arc weld process. Welding shall be in accordance with manufacturer's standard practices in compliance with the applicable sections, relating to design requirements and allowable stresses of the latest edition of the "AWS Structural Welding Code D1.1".
  3. Field connections shall normally be the bolting of structural members using high strength bolts and machine bolts in shop drilled, punched or reamed holes, in accordance with manufacturer's standard practices.
  4. Workmanship and tolerances of the manufactured building parts shall be in accordance with manufacturer's quality control standards.
- B. Shop painting of members with shop primer paint shall be provided for the purpose of protecting the steel member during transportation, job site storage, and during erection. Shop primer does not provide the appearance, durability and/or protection of an appropriate field applied finish. Manufacturer is not responsible for any deterioration of the shop primer paint as a result of improper handling and/or storage. Manufacturer shall not be responsible for any field applied paint and/or coatings.
  1. Cleaning of steel members shall normally be the removal of oil, dirt, loose scale and/or foreign matter prior to painting in accordance with SSPC-SP2.
  2. Coating of steel members shall normally be one shop coat of manufacturer's standard primer paint in accordance with the standard practices of manufacturer,



and generally shall equal or exceed the end performance requirements of Federal Specifications SSPC # 15.

- C. All framing members shall carry an easily visible identifying painted or stenciled piece mark.

## 2.11 INSULATION

### A. Insulation System, General:

1. Roof Insulation: A pre-installed R-value of 30 and a thickness of 9-1/2 inches. Insulation shall be comprised of a double layer (R-19 + R-11) system of blanket insulation and fabric cover as specified below. It is important to consider the roof type (standing seam or screw down) and clip height if installing a double layer system.
  - a. Approved Product: Purlin Glide FP system manufactured by GBP Silvercote, Solon, Ohio, or Architect equal in accordance with Paragraph 2.1.
2. Wall Insulation: A pre-installed R-value of R-19 and a thickness of 6 inches of blanket insulation and fabric cover specified below.
  - a. Approved Product: Purlin Glide FP system manufactured by GBP Silvercote, Solon, Ohio, or Architect equal in accordance with Paragraph 2.1.
3. Equipment: Dispensing device shall be Purlin Gliders as provided by GBP Silvercote. These machines consist of a lightweight, welded steel frame weighing approximately 50 pounds that dispense the fabric when advanced by rooftop workers.

### B. Blanket Insulation:

1. Specification: Complies with ASTM C553, Type I and ASTM C665, Type I Plain. Composed of inorganic glass fibers bonded with a thermoset resin.
2. Fire Hazard Classification: ASTM E84:
  - a. Maximum Flame Spread Index: 25.
  - b. Maximum Smoke Developed Index: 50.
3. Noncombustibility: ASTM E136, meets requirements.
4. Size:
  - a. Roof:
    - 1) Thermal Resistance: R-30 (R-19 + R-11)
    - 2) Thickness
      - a) R-19: 6 inches
      - b) R-11: 3-1/2 inches
    - 3) Width: As indicated or required from the following:
      - a) 36 inches
      - b) 48 inches

- c) 60 inches
      - d) 72 inches
    - b. Walls:
      - 1) Thickness: 6 inches
      - 2) Thermal Resistance: R-19
      - 3) Width: As indicated or required from the following:
        - a) 36 inches
        - b) 48 inches
        - c) 60 inches
        - d) 72 inches
  - 5. Approved Product: Guardian Silvercote Metal Building Insulation, or Architect approved equal in accordance with Paragraph 2.1.
- C. Fabric Facing: A cross-woven reinforced high-density polyethylene yarns coated on both sides with a continuous white polyethylene film. This material is manufactured in custom-fit rolls by hot-air compression welding. Rolls are fabricated to fit the building's secondary steel layout and allow for rapid installation.
- 1. Approved Product: Purlin Glide FP fabric manufactured by GBP Silvercote, Solon, Ohio, or Architect equal in accordance with Paragraph 2.1.
- D. Accessories:
- 1. Straps: For retention of insulation at walls and roof.
    - a. Type/Size: High-tensile-strength steel as recommended by insulation manufacturer to suit application.
    - b. Finish: Galvanized, primed, and painted white to match fabric vinyl liner finish.
  - 2. Fasteners: As recommended by insulation manufacturer to suit application.
  - 3. Tapes and Sealers:
    - a. Self-adhesive type recommended by insulation facing manufacturer for sealing joints between units and compatible with their facing material.
    - b. Color: White.
  - 4. Other Materials: Provide other materials, not specifically described, but required for a complete and proper installation.

## 2.12 GUTTER, DOWNSPOUT, AND MATERIALS

- A. General: Gutters and downspouts shall be sized in accordance with SMACNA standards and practices to handle rainwater. Special provisions for rainwater over flow, icing, and blocked downspouts shall be considered.

**B. Gutters and Flashing:**

1. Material: 26 gauge Galvalume steel, except as otherwise recommended by SMACNA manual for the application, or otherwise indicated.
2. Flashing at the rake (parallel to roof panels) and high eave shall not compromise the integrity of the roof system by constricting movement due to thermal expansion and contraction.
3. Finish: Kynar 500 or Hylar 5000 finish in color selected by Architect from manufacturer's full range.

**C. Downspouts:**

1. Material: 26 gauge Galvalume steel, rectangular in shape, unless indicated otherwise.
2. Finish: Kynar 500 or Hylar 5000 finish in color selected by Architect from manufacturer's full range.

**D. Sheet Lead: Comply with FS QQ-L-201, Grade B.**

1. 4 pound minimum at sanitary vent flashing.

**E. Fasteners:**

1. Same metal as flashing/sheet metal or other non-corrosive metal.
2. Exposed fasteners shall be self-sealing and gasketed for weathertight installation. (ZAC type). Provide stainless steel fasteners where they are exposed.
3. Match finish of exposed heads with material being fastened.
4. Mechanical Fasteners:
  - a. Nails: Ring shank, minimum 1-1/2 inches in length with 1/2 inch diameter head.
  - b. Washers: Steel washers with bonded rubber sealing gasket.
  - c. Screws: Self-tapping sheet metal type of stainless steel or compatible with material being fastened, with integral EPDM washers.
  - d. Rivets: Stainless steel and cadmium plated material, closed end type of sizes recommended by sheet metal manufacturer to suit application.
5. Clips: Shall be minimum 0.050 inch aluminum or 20 gauge stainless steel.

**F. Splash Blocks (As indicated or required): Concrete type, of size and profiles indicated; minimum 3,000 psi compressive strength at 28 days, with minimum five (5) percent air entrainment.**

**2.13 ACCESSORIES**

- A.** Roof flashing units shall be used for roof mounted mechanical equipment and/or vents. Openings in roof and flashing units shall be field cut to required sizes. Flashing units are not intended to support any type of load. Loads are supported by means of sub frames and/or auxiliary secondary support systems. Flashing base configuration shall match the panel profile on which it is used.

- B. Roof curb units are available for peak or hillside applications. Base configurations match the roof panel on which it is used. Curbs are at least 18 gage galvanized material with welded construction. Top flanges are turned in as standard and accommodate rigid installation. All sizes shall have baked-on powder coated finish to match roof panel color.
- C. Frame openings in walls shall be an opening framed with 16 gage minimum, cold-formed members, designed to meet the specified loads. Openings shall be trimmed in accordance with manufacturer's standard practices.
- D. Overhead Coiling Doors: As specified in Division 08 Section "Overhead Coiling Doors".
- E. Hollow Metal Doors and Frames: As specified in Division 08 Section "Hollow Metal Doors and Frames".
- F. Aluminum Entrances, Storefronts, and Windows: As specified in Division 08 Section "Aluminum Entrances, Storefronts, and Windows".
- G. Door Hardware: As specified in Division 08 Section "Door Hardware".
- H. Glazing: As specified in Division 08 Section "Glazing".
- I. Other Materials: Provide other materials, not specifically described, but required for a complete and proper installation

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Building anchor bolts shall be designed to resist the maximum column reactions resulting from the specified combinations of loadings. The manufacturer shall specify the minimum diameter, spacing and projections required to transfer the loads from the column to the anchor bolts. General Contractor shall furnish anchor bolts to concrete contractor for embedment in his concrete work specified in Division 03. Anchor bolt quantity at each base plate shall be in compliance with OSHA Subpart R regulations.

- B. Foundations shall be adequately designed by a qualified foundation engineer to support the building reactions and other loads that may be imposed by the building use. The design shall be based on the specific soil conditions of the building site. The foundation engineer shall be retained by other than the manufacturer. The manufacturer assumes no responsibility for the integrity of the foundation. The foundation engineer shall be responsible for the transfer of reactions from the anchor bolts to the foundations.
- C. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- D. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated

### 3.3 ERECTION AND INSTALLATION

- A. Erect building system in accordance with the appropriate erection drawings, erection guides and/or other documents furnished by manufacturer. It shall be the erector's responsibility to comply with all appropriate legal and safety requirements. It shall be the erector's responsibility to determine and provide any and all temporary bracing, shoring, blocking, bridging, and/or securing of components, etc., as required during erection of the building.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- C. Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base and Bearing Plates: Clean concrete- bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.

2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven (7) days after placement.
1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 Bolts" for type of bolt and type of joint specified.
    - a. Joint Type: Snug tightened or pretensioned.
- G. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.
1. Provide rake or gable purlins with tight-fitting closure channels and fascia.
  2. Locate and space wall girts to suit openings such as doors and windows.
  3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
1. Tighten rod and cable bracing to avoid sag.
  2. Locate interior end-bay bracing only where indicated.
- I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges".

### 3.4 METAL PANEL INSTALLATION, GENERAL

- A. Metal Roof Panels:
1. Install metal roof panels in full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations.
  2. Install metal roof panels in accordance with manufacturer's instructions.
- B. Metal Wall Panels:
1. Install metal wall panels of full length from foundation to eave, unless otherwise indicated or restricted by shipping limitations.
  2. Install metal wall panels in accordance with manufacturer's instructions.

- C. Examination: Examine primary and secondary framing to verify that structural panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
  - 1. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.
- D. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Field cut metal panels as required for openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
    - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
  - 2. Install metal panels perpendicular to structural supports, unless otherwise indicated.
  - 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
  - 3. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 4. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 5. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- E. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- F. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.
  - 1. Seal metal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal panel manufacturer.

### 3.5 INSULATION INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install in accordance with manufacturer's instructions.
- C. Install in exterior spaces without gaps or voids. Do not compress insulation.

- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.
- F. Install insulation with vapor barrier installed facing the warm side. Seal or tape joints as required.

### 3.6 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  - 2. Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
  - 3. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- B. Hollow Metal Doors and Frames: Refer to Division 08 Section "Hollow Metal Doors and Frames".
- C. Aluminum Entrances, Storefronts, and Windows: Refer to Division 08 Section "Aluminum Entrances, Storefronts, and Windows".
- D. Glass: Refer to Division 08 Section "Glazing".
- E. Door Hardware: Refer to Division 08 Section "Door Hardware".
- F. Gravity Ridge Ventilators: Manufacturer's standard.
- G. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
- H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.
- I. Sealants: Refer to Division 07 Section "Joint Sealants".
- J. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 4 feet o.c. using manufacturer's



standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

- K. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
  - 1. Discharge downspouts on concrete splash pads where roof drainage dumps on ground.
  - 2. Tie downspouts to underground drainage system where indicated or required.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.
- B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports as required by code authorities having jurisdiction.
- C. Tests and Inspections:
  - 1. High-Strength, Field-Bolted Connections: Connections shall be tested and inspected during installation according to RCSC's Specification for Structural Joints Using ASTM A325 or A490 Bolts.
  - 2. Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1 and the following inspection procedures, at inspector's option:
    - a. Liquid Penetrant Inspection: ASTM E165.
    - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E164.
    - d. Radiographic Inspection: ASTM E94.
- D. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

### 3.8 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
  - 1. Clean and prepare surfaces by SSPC-SP 2, Hand Tool Cleaning or SSPC-SP 3, Power Tool Cleaning.

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Metal Roof and Wall Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures at no additional expense to Owner.
- D. Protect installed metal building system to ensure that, except for normal weathering, metal building system will be without damage or deterioration at time of Substantial Completion.

END OF SECTION