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Bidding Requirements (including Invitation to Bids, Instructions to Bidders, and Bid Forms) are issued by the Owner under separate cover and are not included in the Project Manual.

CONTRACTING REQUIREMENTS

Contracting Requirements (including Agreement, General Conditions, Bond, and Certificate Forms) are issued by the Owner under separate cover and are not included in the Project Manual.

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PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Provide temporary facilities and controls needed for the Work including, but not necessarily limited to:
 - 1. Temporary utilities such as heat, water, electricity and telephone;
 - 2. Field office for the Contractor's personnel and area for meetings with Owner and Architect or Owner's other Consultants;
 - 3. Sanitary facilities;
 - 4. Temporary barriers of the construction site;
 - 5. Project sign – Sign shall be approved and include the Owner and Architect's information.
- B. Related Work:
 - 1. Except that equipment furnished by Subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work are not part of this Section.

1.2 PRODUCT HANDLING

- A. Maintain temporary facilities and controls in proper and safe conditions throughout progress of the Work.

PART 2 - PRODUCTS

2.1 UTILITIES

- A. General: The Contractor shall provide water and electrical power utility service required by the Work.
- B. Water:
 - 1. Provide necessary temporary piping and water supply and, upon completion of the Work, remove such temporary facilities.
- C. Electricity:
 - 1. Provide necessary temporary wiring and, upon completion of the Work, remove such temporary facility.
 - 2. Provide area distribution boxes so located that the individual trades may furnish and use 100 ft. maximum length extension cords to obtain power and lighting at points where needed for Work, inspection and safety.
- D. Telephone:
 - 1. Make necessary arrangements and pay costs for installation and operation of telephone service to the Contractor's office at the site.
 - 2. Make the telephone available to the Architect and Owner for use in connection with the Work.

2.2 FIELD OFFICES AND SHEDS

- A. Contractor's facilities:
 - 1. Provide a field office building and sheds adequate in size and accommodation for

- Contractor's offices, supply and storage.
2. Within the Contractor's facilities, provide enclosed space adequate for holding project meetings. Furnish with table, chairs and utilities.

B. Sanitary facilities:

1. Provide temporary sanitary facilities in the quality required for use by all personnel.
2. Maintain in a sanitary condition at all times.

2.3 ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

2.4 TEMPORARY BARRIERS

- A. Provide and maintain for the duration of construction a temporary barrier as required, of design and type needed to prevent entry onto the Work by the public. Install and maintain thereon "Hazardous Area" signs sufficient to warn the public.
1. Provide 6 foot high chain link fence.

2.5 PROJECT SIGNS

- A. Prior to start of construction, submit proposed Project sign layout to the Architect for approval.
1. Furnish and install a minimum of one (1) Project Sign.
 2. Project sign shall include the name and logo of Architect and Owner.
 3. Mount Sign at job site where directed by Architect and Owner.
 4. Except as otherwise specifically approved by the Owner, do not permit other signs or advertising on the job site.
 5. Project sign shall be erected on site within 14 days of NTP.
 6. Project sign shall be no less that 4' x 8'. Double sided.
- B. Manufacturer:
1. A+Signs, Decatur, GA.
 2. FAST SIGNS, Smyrna, GA.
 3. FAST SIGNS, Tucker, GA.
 4. FruArt, Decatur, GA.
 5. Rapid Signs, Atlanta, GA
 6. Other manufacturers who provide the specified sign type.
- C. Materials:
1. 96 in. x 48 in. x 3/4 in. Plywood.
 2. Weather resistant Paint & vinyl coatings.
 3. 4 x 4 Wood Lumber. Provide other lumber as required by contractor's design for sign support
 4. Fasteners
- D. Execution:
1. Embed wood lumber post in ground. Mount sing to posts. Brace with wood lumber as necessary.
 2. Install sign erect and plumb.
 3. Maintain sign installation throughout project duration.
 4. Remove sign when directed by Owner.

2.6 TRANSPORTATION FACILITIES

- A. Truck and equipment access:
 - 1. To avoid traffic conflict with vehicles of the Owner's employees, and to avoid overloading of streets and driveways elsewhere on the Owner's property, limit the access of trucks and equipment to the ACCESS ROUTE as directed by the Architect.
 - 2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the job site.

- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

PART 3 - EXECUTION

3.1 SECURITY

- A. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the Access Route and to the actual site of the Work. The Contractor is responsible for providing adequate security to the building and its contents during the construction period. When school is in session and the Contractor is on the premises, the Owner and Contractor will be jointly responsible for security of the building. When the Contractor is on the premises after school hours and no owner's representative is on the premises, the Contractor will be fully responsible for security.

END OF SECTION

SECTION 02831 - CHAIN LINK FENCE AND GATES

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, material and equipment necessary to install poly-vinyl coated (black) chain link fabric, posts, gates, wire and appurtenances. Fencing and gates as shown on Civil Plans shall be 6 foot high black vinyl coated with barbs above shall be provided and installed.

1.2 REFERENCES

- A. Standards of the following as referenced:
 - 1. American Society for Testing and Materials (ASTM).

1.3 SUBMITTALS

- A. Product data: Indicate material types, gauges, sizes and finishes.
- B. Shop Drawings:
 - 1. Perimeter fence: Site specific plan, typical elevation of fence, and construction details including post spacing and foundation details.
 - 2. Sliding Gate: Site specific plan, elevations, and construction details including post spacing and foundation details.
 - 3. Loop detection system: site specific plan indicating location of loop and distance from gate.
 - 4. Dumpster Enclosure: Site specific plan, elevations, and construction details including post spacing and foundation details.
- C. Samples for selections.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Fencing:
 - 1. Provide chain link fence meeting ASTM A491 or ASTM 4392 complete with supports, bracings, gates and other accessories to complete Work indicated.
 - 2. Finish at exposed surfaces: Aluminized fabric in accord with ASTM A491; post, fittings and miscellaneous fittings aluminized in accord with ASTM A491; galvanized fabric coated per ASTM A392.
 - 3. Fence shall be 6' high to top of fabric. If specified, install forty-five degree arms supporting three strands of barbed wire above the fabric.
- B. Posts:
 - 1. General: Form using round steel sections, galvanized per ASTM 123, of the following sizes:
 - 2. Corner and Terminal Posts: Post shall be constructed of schedule 40 steel pipe. They shall be hot-dipped galvanized with a minimum of 1.8 oz./sq. ft. of coated surface area.

- Post shall have an outside diameter of 2-3/8" (2.375"), a minimum wall thickness of .130" and a minimum weight per ft. of 3.117 lb.
3. Line posts: Post shall be constructed of schedule 40 steel pipe. They shall be hot-dipped galvanized with a minimum of 1.8 oz./sq. ft. of coated surface area. Post shall have an outside diameter of 1-7/8" (1.875"), a minimum wall thickness of .120" and a minimum weight per ft. of 2.281 lb.
- D. Top Rails and Braces: Shall be constructed of schedule 40 steel pipe. They shall be hot-dipped galvanized with a minimum of 1.8 oz./sq. ft. of coated surface area. Post shall have an outside diameter of 1-5/8" (1.625"), a minimum wall thickness of .111" and a minimum weight per ft. of 1.83 lb.
- E. Caps, Hardware and Misc.: Post caps shall be formed steel, cast malleable iron or aluminum alloy. Install one cap for each post where barbed wire supporting arms are not required. Top rail and brace ends shall be formed steel, malleable iron or cast iron for connection of rails and braces to terminal posts. Top rail sleeves shall be 6" and allow for expansion and contraction of top rails. Use 9 ga. galvanized steel wire for the attachment to fabric to posts. Double wrap 13 gauge for rails and braces. Hog ring ties of 12-1/2 gauge for attachment of fabric to tension wire. Tension bars shall be in one piece lengths equal to 2" less than full height of fabric with a minimum cross-section of 3/16" x 3/4". Install tension bars where chain link fabric meets terminal posts. Install 7-gauge zinc coated tension wire with tensile strength of 75,000 psi at bottom of fence fabric.
- F. Barbed Wire and Supporting Arms: Barbed wire shall be double strand 12-1/2 gauge galvanized twisted steel line wire, 4-point galvanized steel barb shall be placed approximately 5" on center. Support arms shall be galvanized pressed steel with provision for supporting three stands of barbed wire. Arms shall withstand 250 lb. downward pull at outermost end without failure.
- G. Concrete: Concrete for setting posts shall be 3,000-psi compression strength at 28 days.
- H. Gate Frame: Fabricate gate frames from galvanized steel pipe with an outside diameter of not less than 1.9" and a weight per foot of 2.72 lb. Weld connections to form a rigid one-piece unit.
- I. Gate Hardware: All hardware shall be constructed from hot-dipped galvanized steel. All moveable parts shall be field coated to match adjacent finishes.
- K. Gate Hinges: Hinges shall be structurally capable of supporting gate leaf.
- L. Stretcher bars: 3/16" by 3/4" galvanized steel, 2" less in length than fabric width. Provide one stretcher bar at each gate and end post; two at each corner and pull post.
- M. Poly-Vinyl Coating: provide for all fence, gate, and post members
1. Provide poly-vinyl extruded coating, 0.015 inches minimum coating thickness, conforming to ASTM F-668, in black.
 2. Adhere coating to fabric, posts and appurtenances specified, or otherwise exclude water from entering between coating and coated materials.
- N. Siding Gates : Comply with ASTM F 1184
1. Cantilever - Manufacturer's standard top rail gate incorporating a track for the top roller. Brace frame to prevent sagging . Provide a lockable positive latch and other hardware and accessories as required.

- (a) Class 1: Provide external rollers with accessible grease fittings, a safety enclosure, and guide posts to keep the gate on the rollers.

- O. Plastic Screening Slats (Exterior): Tubular plastic slats designed for use in 2 inch mesh fabric, for vertical installation. Feather Lock Slat by [PrivacyLink](#), Hyde Park, Utah, (800) 574-1076.
 - 1. Color: To be selected by Architect from a full range of manufacturers standard colors.

2.2 GATE OPERATOR

- A. General: Manufacturer's standard design and construction, suitable for gates specified. Select operator size and features according to manufacturer's published data, taking into consideration size, type, weight, and construction of gate, as well as Project conditions and specified requirements.

- B. Type: Electric motor with enclosed gear reducer and chain drive.

- C. Type: Hydraulic drive for smooth, shock-free actuation.

- D. Speed: Minimum 60 feet per minute.

- E. Features: Continuous duty without overloading or overheating. Rated by manufacturer at 30 or more complete cycles per hour. All components UL approved. Furnish disconnect switch with NEMA KS 1; Type 3R enclosure.
 - 1. Provide equipment with suitable electrical characteristics including phase, voltage, branch circuit wire size, overcurrent protection, and connection devices coordinated with Division 16.
 - 2. Self-locking.
 - 3. Weather-resistant steel enclosure protecting all operating parts.
 - 4. Automatic reversing upon obstruction during closing cycle and automatic stop upon obstruction during opening cycle.

- F. Controls: Electric and electronic programmable controls separated from motor and drive mechanism, sealed from water and insects, with space for additional optional equipment. Provide adjustable automatic closing timer and the following remote control device:
 - 1. Single-button control.
 - 2. Three-button open/close/stop switch.
 - 3. Card reader with codes to allow four different access periods.
 - 4. Vehicle loop and loop detection system: Located for exit access only complying with the following requirements:
 - a. Below paving or flush with paving.
 - 5. Fire Strobe 2000 system or approved equivalent complying with the following requirements:
 - a. Frequency: 14Hz for class II signals
 - b. Responds to both OPTICOM and STROBECOM II emitters.
 - c. Strobe acquisition time: 0.5 seconds
 - d. PC board construction: enclosed 8"x8"x4" rain tight NEMA J-Box
 - e. Power requirements: 12/24 Volts AC/DC non polarity conscious, approximately 1 Watt

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Fence Framing: Install in accordance with ASTM F 567 and manufacturer's instructions. Locate terminal posts at each fence termination. Space line posts at 10 feet centers. Concrete set all posts in holds bored with a diameter at least 4 times greater than the outside dimensions of the post. Holes shall be 42" deep. Set post bottoms 36" below grade. Place concrete in a continuous pour, trowel finish the surface and slope to direct water away from posts. Install horizontal pipe brace at mid-height on each side of terminal posts. Install diagonal truss rods at these points; install braces and adjust truss rod. Install bottom tension wire before stretching fabric and attach to each post with ties or clips. Install the top rail in lengths of 21 feet. Connect top rail joints with sleeves for rigid connection with expansion/contraction. Install fabric on security side, attach so that fabric remains in tension after pulling force is released. Leave approximately 2" between finished grade and bottom of selvedge. Attach fabric with wire ties or clips to line posts at 15" on center, to rails, braces, and tension wire at 24" on center. To install tension bars, pull fabric taut, thread bar through fabric and attach to terminal posts with bands or clips spaced a maximum of 15" on center.
- B. Gates: Install gates plumb, level and secure for full opening without interference. Attach hardware by means which will prevent unauthorized removal. Adjust hardware for smooth operation.
- C. Accessories: Bend ends of tie wires to minimize hazard to persons and clothing. Install nuts or fasteners opposite the fabric side of the fence for added security. Install extension wires on posts and align perpendicular to the fence. Uniformly space parallel rows of barbed wire on the security side of the fence. Pull wire taut and attach in clips or slots of each extension.
- D. Barbed Wire and Tension Wire: Install wire when indicated on the drawings.
- E. Protect surfaces from damage until Certification of Substantial Completion date. Replace components damaged prior to Certificate of Substantial Completion date.

END OF SECTION

PART 1 - GENERAL

1.01 WORK INCLUDED

Design, manufacture, and supply wood Trusses as shown on Construction Documents and as specified.

1.02 DEFINITIONS

- A. *BCSI: Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses* jointly produced by the Structural Building Components Association (SBCA) and the Truss Plate Institute (TPI).
- B. *Building*: Structure used or intended for supporting or sheltering any use or occupancy.
- C. *Building Code*: As it applies to a Building, any set of standards set forth and enforced by a jurisdiction for the protection of public safety.
- D. *Building Designer*: Owner of the Building or the individual or organization who contracts with the Owner for the design of the Building Structural System and/or who is responsible for the preparation of the Construction Documents. When mandated by the legal requirements, the Building Designer shall be a Registered Design Professional.
- E. *Building Structural System*: Completed combination of structural elements, Trusses, connections and other systems, which serve to support the Building's self-weight and the specified loads to the foundation or ground.
- F. *Construction Documents*: Written, graphic and pictorial documents prepared or assembled for describing the design (including the Building Structural System), location and physical characteristics of the elements of a Building necessary to obtain a Building permit and construct a Building.
- G. *Contractor*: Owner of the Building or the person who contracts with the Owner, who constructs the Building in accordance with the Construction Documents and the Truss Submittal Package. The term "Contractor" shall include those subcontractors who have a direct contract with the Contractor to construct all or a portion of the construction.
- H. *Cover/Truss Index Sheet*: Sheet that is signed and sealed, where required by the legal requirements, by the Truss Designer, and depending on the legal requirements shall be permitted to contain the following information: (1) identification of the Building, including Building name and address, lot, block, subdivision, and city or county; (2) identification of Construction Documents by drawing number(s) with revision date; (3) specified Building Code; (4) computer program used; (5) roof dead and live loads; (6) floor dead and live loads; (7) wind load criteria from a specifically defined code (e.g., ASCE 7) and any other design loads (such as ponding, mechanical loads, etc.); (8) name, address and license number of Registered Design Professional for the Building, if known; (9) a listing of the individual identification numbers and dates of each Truss Design Drawing referenced by the Cover/Truss Index Sheet; and (10) name, address, date of drawing and license number of Truss Designer.
- I. *Owner*: Person having a legal or equitable interest in the property upon which a Building is to be constructed, and: (1) either prepares, or retains the Building Designer or Registered Design Professional to prepare the Construction Documents; and (2) either constructs, or retains the Contractor to construct the Building.
- J. *Permanent Individual Truss Member Restraint*: Restraint that is used to prevent local buckling of an individual Truss chord or web member due to the axial forces in the individual Truss member (see BCSI).
- K. *Registered Design Professional*: Architect or engineer, who is licensed to practice their

respective design profession as defined by the legal requirements of the jurisdiction in which the Building is to be constructed.

- L. *Truss*: Individual metal plate connected wood component manufactured for the construction of a Building.
- M. *Truss Design Drawing*: Written, graphic and pictorial depiction of an individual Truss that includes the information required in item E of Section 1.03 Design.
- N. *Truss Designer*: Person responsible for the preparation of the Truss Design Drawings. Where the legal requirements mandate a Registered Design Professional for buildings, the Building Designer and Truss Designer shall be a Registered Design Professional.
- O. *Truss Manufacturer*: Person engaged in the fabrication of Trusses.
- P. *Truss Placement Diagram*: Illustration identifying the assumed location of each Truss.
- Q. *Truss Submittal Package*: Package consisting of each individual Truss Design Drawing, and, as applicable, the Truss Placement Diagram, the Cover/Truss Index Sheet, lateral restraint and diagonal bracing details designed in accordance with generally accepted engineering practice, applicable BCSI-defined lateral restraint and diagonal bracing details, and any other structural details germane to the Trusses.

1.03 DESIGN

- A. Trusses shall be designed in accordance with ANSI/TPI 1, *National Design Standard for Metal Plate Connected Wood Truss Construction* and this specification. Where any applicable design feature is not specifically covered by ANSI/TPI 1 or this specification, design shall be in accordance with the applicable provisions of the latest edition of ANSI/AWC NDS - *National Design Specification*[®] (*NDS*[®]) *for Wood Construction*, and all applicable legal requirements.
- B. Truss Manufacturer shall furnish Truss Design Drawings prepared in accordance with all applicable legal requirements.
- C. If required by the Construction Documents and the Truss Manufacturer's contract, the Truss Manufacturer shall furnish a Truss Placement Diagram which shall provide at a minimum the location assumed for each Truss based on the Truss Manufacturer's interpretation of the Construction Documents
- D. Where required by the Truss Manufacturer's contract, the local Building official or applicable legal requirements, the Truss Manufacturer shall submit the Truss Submittal Package to the Building Designer and/or the local Building official for review and approval prior to the manufacturing of the Trusses.
- E. The Truss Design Drawings shall include, at a minimum, the following information:
 - 1. Building Code used for design, unless specified on Cover/Truss Index Sheet,
 - 2. Slope or depth, span, and spacing.
 - 3. Location of all joints and support locations.
 - 4. Number of plies if greater than one.
 - 5. Required bearing widths.
 - 6. Design loads as applicable, including:
 - Top chord live load (for roof Trusses this shall be the controlling case of live, rain or snow load);

- Top chord dead load;
 - Bottom chord live load;
 - Bottom chord dead load;
 - Additional loads and locations.
 - Environmental load design criteria (wind speed, snow, seismic, and all applicable factors as required to calculate the Truss loads); and
 - Other lateral loads, including drag strut loads.
7. Adjustments to wood member and metal connector plate design values for conditions of use.
 8. Maximum reaction force and direction, including maximum uplift reaction forces where applicable.
 9. Metal connector plate type, manufacturer, size, thickness or gauge, and the dimensioned location of each metal connector plate except where symmetrically located relative to the joint interface.
 10. Size, species, and grade for each wood member;
 11. Truss-to-Truss connection and Truss field assembly requirements.
 12. Calculated span to deflection ratio and/or maximum vertical and horizontal deflection for live and for live plus dead load and K_{CR} (creep factor) as applicable.
 13. Maximum axial compression and tension forces in the Truss members.
 14. Fabrication tolerance per ANSI/TPI 1.
 15. Required Permanent Individual Truss Member Restraint location.
 16. Truss Designer

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber

1. Lumber used shall be identified by grade mark of a lumber inspection bureau or agency approved by the American Lumber Standards Committee, and shall be the size, species, and grade as shown on the Truss Design Drawings, or equivalent as approved by the Truss Designer.
2. Adjustment of value for duration of load or conditions of use shall be in accordance with ANSI/TPI 1.
3. Fire retardant treated (FRT) lumber, if applicable, shall meet the specifications of the fire retardant chemical manufacturer, the Truss design and ANSI/TPI 1 and shall be re-dried after treatment to 19 percent maximum moisture content at temperatures not to exceed 160°F (71°C) in accordance with AWWA Standards C20. FRT lumber design values shall be developed from approved test methods and procedures that consider potential strength-reduction characteristics, including the effects of elevated temperature and moisture. Design values shall be approved by the authorities having jurisdiction. Lumber treater shall supply certificate of compliance.

B. Metal Connector Plates

1. Metal connector plates shall be manufactured by a SBCA member plate manufacturer and shall be of galvanized steel, aluminum-zinc alloy coated steel or stainless steel conforming to the requirements of ANSI/TPI 1. Minimum thickness in inches (or mm for metric units), including both uncoated and coated thicknesses, if galvanized and aluminum-zinc alloy coated, shall be specified for each type of metal connector plate. Working stresses in steel are to be applied to effectiveness ratios for plates as determined by test and in accordance with ANSI/TPI 1.
2. In highly corrosive environments, special applied coatings or stainless steel may be required, as specified in the Construction Documents
3. At the request of Building Designer, an SBCA member plate manufacturer shall furnish a certified record that materials comply with steel specifications.

2.02 MANUFACTURING

Trusses shall be manufactured to meet the quality requirements of ANSI/TPI 1 and in accordance with the information provided in the final approved Truss Design Drawings.

PART 3 - EXECUTION

3.01 HANDLING, INSTALLING, AND BRACING

- A. Trusses shall be handled during manufacturing, delivery and by the Contractor at the job site so as not to be subjected to excessive bending.
- B. Trusses shall be unloaded in a manner so as to minimize lateral strain. Trusses shall be protected from damage that might result from on-site activities and environmental conditions. Trusses shall be handled in such a way so as to prevent toppling when banding is removed.
- C. Contractor shall be responsible for the handling, installation, and temporary restraint/bracing of the Trusses in a good workmanlike manner and in accordance with the recommendations set forth in SBCA/TPI's *Building Component Safety Information (BCSI): Guide to Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses*.
- D. Apparent damage to Trusses, if any, shall be reported to Truss Manufacturer prior to erection.
- E. Trusses shall be set and secured level and plumb, and in correct location. Each Truss shall be held in correct alignment until specified permanent restraint and bracing is installed.
- F. Cutting and altering of Trusses is not permitted. If any Truss should become broken, damaged, or altered, written concurrence and approval by a Registered Design Professional is required.
- G. Concentrated loads shall not be placed on top of Trusses until all specified restraint and bracing has been installed and structural sheathing is permanently nailed in place. Specifically avoid stacking full bundles of construction materials or other concentrated loads on top of Trusses.
- H. The Truss Submittal Package and any supplementary information provided by the Truss Manufacturer shall be provided by the Contractor to the individual or organization responsible for the installation of the Trusses.
- I. Trusses shall be permanently restrained and braced in a manner consistent with good Building practices as outlined in BCSI and in accordance with the requirements of the Construction Documents. Trusses shall furthermore be anchored or restrained to prevent out-of-plane movement so as to keep all Truss members from simultaneously buckling together in the same direction. Such permanent lateral restraint shall be accomplished by: (a) anchorage to solid end walls; (b) permanent

diagonal bracing in the plane of the web members; or (c) other suitable means.

J. Materials used in temporary and permanent restraint and bracing shall be furnished by Contractor.

PART 1 - GENERAL

1.1 SUMMARY:

- A. Work of this section includes:
 - 1. Lavatory (Restroom sink) tops with integral sinks.

1.2 REFERENCES:

- A. Applicable standards: Standards of the following, as referenced herein~
 - 1. American National Standards Institute (ANSI)
 - 2. ASTM International (ASTM)

1.3 SUBMITTALS:

- A. Shop drawings: Indicate dimensions, component sizes, fabrication details attachment provisions and coordination requirements with adjacent work.
- B. Samples: Submit minimum 6" by 6" samples. Indicate full range of color and pattern variation. Approved samples will be retained as a standard for work.
- C. Product data: Indicate product description, fabrication information and compliance with specified performance requirement.
- D. Maintenance data: Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in project closeout documents.

1.4 QUALITY ASSURANCE:

- A. Job mock-up:
 - 1. Prior to final approval of shop drawings, erect at project site, for Architect's review, one full size mock-up of each component required.
 - 2. Should mock-up not be approved, re-fabricate and re-install until approval is secured. Remove rejected units from project site.
 - 3. Approved mock-ups may remain as part of finished work.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver no components to project site until areas are ready for installation. Store indoors.
- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.6 WARRANTY:

- A. Provide manufacturer's warranty against defects in materials. Warranty shall provide for replacement material and labor for a period of ten years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOLID SURFACING MATERIAL:

- A. Acceptable products:
 - 1. Basis of design: E. I. du Pont de Nemours & Co., Inc., Conan.
 - 2. Avonite, Inc., Formastone.
 - 3. Wilsonart International, Gibraltar.

- B. Material: Cast, 100% acrylic resin, solid, structural surfacing material.
 - 1. Material shall be through—patterned and homogeneous. No coated materials nor non—homogeneous materials allowed.
 - 2. Hardness: Minimum 55 Barcol hardness, tested in accord with ASTM D2583—95(2001), or minimum 90 Rockwell hardness, tested in accord with ASTM D785—98.
 - 3. Tensile strength: Minimum 4,200 psi, tested in accord with ASTM D638—01.
 - 4. Abrasion resistance: Maximum 0.4 grams at 1,000 cycles, tested in accord with ASTM C501—84 (2002)
 - 5. Fire resistance: Flame spread and smoke developed meeting ASTM E84—04, Class I rating.
 - 6. Color stability: No change in 200 hours, tested in accord with NEMA LD3.
 - 7. Water absorption: Maximum 0.04% for 3/4", 0.06% for 1/2", 0.08% for 1/4", tested in accord with ASTM D570—98.
 - 8. Fungal resistance: •No attack when tested in accord with ASTM G21—96(2002).
 - 9. Bacterial resistance: No attack when tested in accord with ASTM G22—76(1996).
 - 10. Impact resistance: No fracture when tested in accord with NEMA LD 3—3.3, 36" for 1/4", 144" for 1/2", 204" for 3/4" drop.
 - 11. Superficial damage to a depth of 0.10" shall be repairable by sanding and polishing.

2.2 CHARACTERISTICS:

- A. Finish: Matte (Gloss rating of 5—20) -

- B. Thicknesses:
 - 1. Lavatory (Restroom sink) tops: 3/4", or as indicated on drawings.

- C. Colors.: Colors as indicated on drawings or as selected by Architect from basis of design manufacturer's Group E color range.

- D. Lavatory tops with bowls:
 - 1. Provide configurations indicated.
 - 2. Provide backsplashes, end splashes and aprons as indicated.
 - 3. Bowls shall be integral with and same material and appearance as adjacent tops.
 - 4. Counters shall have removable front panel to allow access to water shut offs.

2.3 ACCESSORY PRODUCTS:

- A. Joint adhesive: Manufacturer's standard, two—part adhesive kit to create inconspicuous, non-porous joints, with a chemical bond.

- B. Sealant: Manufacturer's standard mildew—resistant, FDA/UL recognized silicone sealant in color matching surfacing or clear formulations.

- C. Sink/bowl mounting hardware: Manufacturer's approved bowl clips, brass inserts and fasteners for attachment of undermount sinks/bowls.

2.4 FABRICATION:

- A. Factory—fabricate components to greatest extent practicable, to sizes and shapes indicated, in accord with approved shop drawings.
- B. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints and without voids. Attach a 2" wide reinforcing strip of solid surfacing under each joint.
- C. Provide factory cutouts for plumbing fittings and bath accessories as indicated.
- D. Rout and finish component edges to a smooth, uniform finish. Rout cutouts and sand edges smooth. Machine radii and contours to template. Repair or reject defective and inaccurate work.
- E. Edge treatment for tops: As indicated on drawings.
- F. Cold surfaces:
 - 1. Make cutouts to template furnished by cold appliance manufacturer.
 - 2. Reinforce joints and cutouts in accord with surfacing manufacturer's product data.
 - 3. Provide installation between surfacing and adjacent cold appliances.
 - 4. Thermally isolate hot and cold appliances.
- G. Hot surfaces:
 - 1. Provide expansion joints in countertops as indicated on shop drawings.
 - 2. Make cutouts to template furnished by hot appliance manufacturer.
 - 3. Reinforce joints and cutouts in accord with surfacing manufacturer's product data.
 - 4. Provide insulation between surfacing and adjacent hot appliances.
 - 5. Thermally isolate hot and cold appliances.
 - 6. Provide venting of cabinets as indicated on drawings.

2.5 SOURCE QUALITY CONTROL:

- A. Allowable tolerances:
 - 1. Variation in component size: $\pm 1/8"$.
 - 2. Location of openings: $\pm 1/8"$ from indicated location.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install components plumb, level and rigid, scribed to adjacent finishes, in accord with approved shop drawings and product data.
- B. Form field joints using specified adhesive, with joints inconspicuous in finished work.
- C. Install top mount sinks/bowls to countertops using specified adhesives and color—matched silicone sealants.

- D. Install under mount sinks/bowls to countertops per manufacturers written instructions.
- E. Provide back and end splashes as indicated. Adhere to countertops using specified color—matched silicone adhesive.
- F. Keep components clean during installation. Remove adhesives, sealants and other stains. Keep clean until Date of Substantial Completion. Replace stained components.
- G. Make plumbing connections to sinks in accord with Mechanical Division of the Specifications.

3.2 PROTECTION:

- A. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged work which cannot be repaired.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Batt Insulation.
 - 2. Rigid Foam Insulation
 - 3. Spray Foam Insulation

- B. Related Requirements:
 - 1. Section 04200 - Unit Masonry Assemblies: Masonry fill insulation.
 - 2. Section 07840 - Firestopping: Safing insulation used in conjunction with fire stop material.
 - 3. Section 09250 - Gypsum Board: Metal furring.

1.2 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. Publications are referenced within the text by the basic designation only.

- B. ASTM International (ASTM):
 - 1. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM C 578 - Rigid, Cellular Polystyrene Thermal Insulation.
 - 3. ASTM C 665 - Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 4. ASTM C 1289 - Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 5. ASTM E 136 - Behavior of Materials in a Vertical Tube furnace at 750 C.

1.3 DEFINITIONS

- A. Concealed Insulation: Insulation concealed within framing system, both faces protected by finish material.

- B. Exposed Insulation: Insulation exposed within framing system, one or both faces unprotected.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Transport, handle, store, and protect products in compliance with the requirements of Section 01600 and manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide products from one of the following manufacturers as specified in the Materials paragraph below:
 - 1. Atlas Roofing Corp., Atlanta, GA (800) 933-1476.
 - 2. CertainTeed Corporation, Valley Forge, PA (800) 523-7844.
 - 3. Dow Chemical Company, Midland, MI (800) 232-2436.
 - 4. Firestone Building Products Company, Carmel, IN (800) 428-4442.
 - 5. Guardian Fiberglass Incorporated, Albion, MI (800) 748-0035.
 - 6. Johns Manville Insulations, Denver, CO (877) 766-3295.

7. Owens-Corning, Toledo, OH (800) 438-7465.
8. Pactiv Building Products, Atlanta, GA (800) 241-4402.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods specified. Identify materials with appropriate markings of applicable testing and inspecting agency.

2.3 MATERIALS

- A. Batt Insulation: ASTM C 665 mineral fiber blanket insulation.
1. Unfaced Glass Fiber: Type I (blankets without membrane facing); with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively passing ASTM E 136 for combustion characteristics.
 2. Faced, Glass-Fiber: Type III (blankets with reflective membrane facing), Class A (membrane-faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with vapor-retarder membrane on 1 face.
 3. Sound Attenuation Insulation (Sound Batts): Unfaced glass fiber batt insulation as specified above.
 4. Provide batt insulation by one of the following manufacturers:
 - a) CertainTeed Corporation.
 - b) Guardian Fiberglass, Inc.
 - c) Johns Manville.
 - d) Owens Corning.
- B. Rigid Foam Insulation: Where indicated on the Drawings.
1. Extruded Polystyrene:
 - a) Thermal Resistance: minimum R-5 per inch
 - b) Compressive Strength: Type X minimum 15 psi; Type IV minimum 25 psi
 - c) Meeting the requirements of ASTM C578
 - d) Provide one of the following or approved equivalent:
 - 1) Dow: Styrofoam Brand Cavitymate.
 - 2) Owens Corning: Foamular CW15/CW25.
- C. Spray Foam Insulation: Closed Cell Spray Polyurethane Foam. Installed where indicated on the Drawings.
1. Class I ASTM E 84 with maximum flame-spread and smoke-developed indexes of 20 and 450, respectively.
 2. A minimum 90% closed cell content.
 3. Thermal Resistance: minimum R-6 per inch
 4. Provide spray foam insulation by one of the following manufacturers or approved equivalent:
 - a) Airtight: Sprayfoam 2.0lb.
 - b) Demilec: Heatloc 217-0.
 - c) BASF: Comfort Foam.
 - d) NCFI: Insulstar.
 - e) BaySystems North America: Bayseal
- D. Substitutions: Comply with the requirements of Section 01600.

2.4 ACCESSORIES

- A. Tape: Polyethylene or polyester self-adhering type; two inches wide.
- B. Adhesive: Waterproof type, acceptable to manufacturer of insulation board. Adhesive VOC shall be within the limits of not greater than 70 g/L in accordance with the California's South Coast Air Quality Management District (SCAQMD) Rule No. 1168.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Batt Insulation:
 - 1. Verify adjacent materials are dry and ready to receive installation.
 - 2. Verify mechanical and electrical services within walls have been installed and tested.
- B. Rigid Foam Insulation:
 - 1. Verify substrate and adjacent materials and insulation boards are dry and ready to receive insulation and adhesive.
 - 2. Verify insulation boards are unbroken, free of damage.
- C. Spray Foam Insulation:
 - 1. Verify surfaces to be sprayed with are dry, clean, and secure.
 - 2. Remove sawdust and other debris from areas to be sprayed by blowing with compressed air or vacuuming with shop vacuum.
 - 3. All metals to which foam is to be applied must be free of oil, grease, rust, etc.
 - 4. Primers should be used if necessary.
 - 5. Mask off all areas not to receive spray foam with masking tape and plastic sheeting

3.2 INSTALLATION - BATT INSULATION

- A. Install batt insulation in accordance with manufacturer's instructions, without gaps or voids.
- B. Trim insulation neatly to fit spaces. Use batts free of damage. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- C. Install insulation with factory applied membrane facing warm side in winter of building spaces. Lap ends and side flanges of membrane. Attach insulation in place to framing; tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.

3.3 INSTALLATION - RIGID FOAM INSULATION

- A. Apply insulation in accordance with manufactures recommended application procedures.

3.4 INSTALLATION - SPRAY FOAM INSULATION

- A. Apply insulation in accordance with manufactures recommended application procedures.

3.5 INSTALLATION - INSULATION AT FURRED-OUT MASONRY WALLS

- A. Apply insulation to interior of exterior CMU wall between furring strips where furring is indicated on Drawings.

3.6 SCHEDULES

A. Provide insulation types as scheduled below and as indicated on Drawings.

CONDITION	TYPE OF INSULATION	THICKNESS
Exterior Wall, Soffits, & Ceiling	Faced Batt Insulation	3-1/2 inches (R=11) or 6 inches (R=19) or 8 inches (R-25) as shown; or as required to fill cavity.
Interior Partitions	Unfaced Batt Insulation	3-1/2 inches or 6 inches as Shown.
Sound Attenuation	Unfaced Batt Insulation	3-1/2 inches or 6 inches as Shown.
Masonry Unit Cavity Walls	Rigid Foam Insulation	1 inch (R-5) or 2 inches (R-10) or 2-1/2 inches (R-12.5) or 3 inches (R-15) as shown
Engine Bay Roof (only)	Rigid Foam Insulation	6 inches (R-30)
Roof	Faced Batt Insulation	9-1/2 inches (R-30min)
Roof (Bid Alternate)	Spray Foam Insulation	5 inches (R-30min)

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. ~~Exterior swinging~~ Four-Fold metal doors with surface mounted tube frames.
 - 2. Operation of Four-Fold metal doors includes overhead mounted electro-mechanical operator(s) located on the interior side of the wall.

1.2 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified consisting of manufacturer's technical Product Data and installation instructions for each type of door required, including data substantiating that products comply with requirements.
- C. Submittal Drawings showing fabrication and installation of Four-Fold metal doors including plans, elevations, sections, details of components, hardware, operating mechanism, and attachments to the other units of Work. Include wiring diagrams for coordination with electrical trade.
- D. Reference list including (5) successful installations of this type of door within the past two (2) years.

1.3 SUBMITTALS

- A. Doors shall be designed to withstand external or internal horizontal wind loads of 20 pounds minimum per square foot. The maximum allowable deflection shall not exceed 1/120 of the span. Fiber stresses in main members shall be limited to 27,000 pounds per square inch. Steel frames shall be designed in accordance with the AISC "Steel Construction Manual.
- B. Door manufacturer shall have at least 10 years experience in manufacturing door type specified for emergency vehicle applications.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Transport, handle, store, and protect products in compliance with the requirements of Sections 01600 and manufacturer's recommendations.
 - 1. Store delivered materials and equipment in dry locations with adequate ventilation, free from dust and water, and so as to permit access for inspection and handling.
 - 2. Handle materials carefully to prevent damage.

1.5 WARRANTY

- A. The door manufacturer shall provide a written standard limited warranty for material and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Provide one of the following or equal products by other manufacturers approved in advance: Four-Fold industrial metal doors manufactured by:
1. Door Engineering and Manufacturing (Basis of Design for products specified in part 2): 400 Cherry Street, Kasota, MN 56050, (800)-959-1352 Series: FF100-600 Four-Fold Doors with interior mounted operators.
 2. Richards-Wilcox Canada, Mississauga, Ontario, Canada. Slidetite Series: Four Sections Bi-Parting Interior Mount design to fold (Open) inside.
- B. Substitutions: Submit per requirements of section 01631.

2.2 MATERIALS

- A. Steel Tube: ASTM A513 and ASTM A500/A500M
- B. Steel Sheet: Steel sheets of commercial quality, complying with ASTM A1011/A1011M hot rolled steel sheet.
- C. Hardware: Manufacturer's standard components.
- D. Fasteners: Zinc-coated steel.

2.3 FOUR-FOLD DOORS

- A. Construction: Door framing shall be minimum 11-gauge structural steel tube with 14-gauge steel sheet on the exterior and interior faces. Sheeting shall be formed on the vertical edges with no visible welds on the interior or exterior panel faces. All frames and framing members shall be true to dimension and square in all directions, and no door shall be bowed, warped, or out of line, in the vertical or horizontal plane of the door opening by more than 1/8 inch in 20 feet. Exposed welds and welds which interfere with the installation of various parts shall be ground smooth and flush.
- B. Angle Frame: Supply pre-hung tube frame system constructed of minimum L6x4x0.25, designed to anchor to masonry wall construction or weld to steel structure. All hinges, track supports and operator supports shall be factory attached.
- C. Factory finish: Operator and operating hardware shall be powder coated manufacturer's standard gray. Panels, frame and all other hardware shall be finished as follows.
1. All exposed steel shall be finished with manufacturer's standard epoxy primer and polyurethane top coat, PPG Spectracron or equal. Customer to select from Manufacturer's standard color chart or furnish color to match.
- D. Operating Hardware: Hardware shall include guide tracks and brackets, trolleys, center guides, not less than three pairs of jamb and fold hinges per opening, and all bolts, nuts, fasteners, etc. necessary for complete installation and operation. Jamb hinges shall be dual shear and have two thrust bearings and two needle bearings. Jamb hinges shall be gusseted. Fold hinges shall be dual shear with two thrust bearings. Fold hinges shall be stainless steel. All bearings shall be completely concealed within the hinge barrel and include grease zerks. All hinge pins shall be minimum 3/4" diameter hardened steel.
- E. Weatherstripping: Material shall be adjustable and readily replaceable and provide a substantially weather-tight installation. Weatherstripping at center shall be 1/16" cloth inserted neoprene and include no exposed fasteners on the exterior face of the panel. Weatherstripping at sill shall include two 1/16" cloth inserted neoprene sweeps with an aluminum retainer. The retainer shall be attached to the door with adhesive.

- F. Perimeter Weatherstripping: Provide jamb and head weatherstripping of 1/16" cloth-inserted neoprene bulb (or closed cell neoprene).
- G. Vision Panels: Provide 1" insulated vision panels or grilles of the size, shape and location as noted on the drawings.

2.4 OPERATOR

- A. Each Four-Fold door shall be operated by an overhead mounted electro-mechanical drive unit designed for high cycle operation. Each Operator consists of an electric motor, gear reducer, and rotating drive arm. The door shall be operated with connecting rods attached to the rotating drive arm on the operator and to control arms attached to the jamb door section and to the door lintel. The connecting rods shall be positive drive, keeping the door under firm control at all times. The connecting rods shall be fitted with spherical bearings and control arms shall be equipped with oil impregnated bronze bearings on polished shafts.
- B. Operator shall be instantly reversible, open and close rapidly and start and stop gradually. Operator shall be adjustable to allow door to fully clear the opening. Operator shall automatically lock the door in the closed position. Operator shall be equipped with disengaging mechanism to convert to free wheeling mode for manual operation.
- C. Electric motor shall be of sufficient size to operate doors under normal operating conditions at no more than 75 percent of rated capacity. The motor shall be wound for three phase 208/230/480 VAC, 60 Hertz operation.
- D. Electric Controls: Controls shall be furnished by the door manufacturer and shall be complete for each door, and built in accordance with the latest NEMA standards. Incoming electrical shall be: 208/230VAC 3-phase.
 - 1. Controls Controls shall include a programmable logic controller with digital message display or LED indicators. Controller shall include programmable close timers and programmable inputs/outputs.
 - 2. Motor starters shall be magnetic reversing, factory wired with overload and under voltage protection, and equipped with mechanical interlocks. All control components shall be enclosed in one enclosure with a wiring diagram placed on the inside of the cover
 - 3. If incoming voltage is single phase, control panel shall include a variable frequency drive to convert voltage to 3-phase for the motor.
 - 4. Enclosures shall be NEMA 4 with disconnect switch
 - 5. Pushbuttons (interior) for each door shall have one (1) momentary pressure three-button push-button station marked "OPEN", "CLOSE" and "STOP". Push button enclosure shall be NEMA 4.
 - 6. Limit switches shall be provided to stop the travel of the door in its fully open or fully closed position.
 - 7. Safety edges: Provide electric safety edges on leading edge of all doors to reverse door upon contact with obstruction.
 - 8. Photo eyes: Provide (1) interior, jamb mounted, thru-beam type photo eyes, NEMA 4 rated.
 - 9. Presence Sensor: Provide (1) interior, overhead mounted, presence sensor.
 - 10. Radio controls: Provide one (1) radio receiver and (1) single button remotes per door. Remotes to open and close doors with single button.
 - 11. Timer Activation Loop Detectors (fire station applications): Provide "pulse on exit type" loop detector to activate auto close timer once loop has been activated and cleared, include hand/auto switch to deactivate timer. G.C. to coordinate installation of preformed loop with installer prior to exterior apron being poured.
 - 12. Wiring: Door manufacturer shall supply controls and components only. Electrical contractor shall install controls and furnish and install conduits and wiring for jobsite power and control wiring.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install Four-Fold metal doors in strict accordance with the approved drawings by qualified door erection crews. All door openings shall be completely prepared by the general contractor prior to the installation of the doors. Permanent or temporary electric wiring shall be brought to the door opening before installation is started and shall be completed so as not to delay the inspection test.
- B. Doors shall be set plumb, level, and square, and with all parts properly fastened and mounted. All moving parts shall be tested and adjusted and left in good operating condition.

3.2 ADJUSTING AND CLEANING

- A. Inspection of the doors and a complete operating test will be made by the installer in the presence of the general contractor or architect as soon as the erection is complete. Any defects noted shall be corrected. After door approval in the above test, the general contractor must assume the responsibility for any damage or rough handling of the doors during construction until the building is turned over to the owner and final inspection is made.
- B. Clean surfaces and repaint abraded or damaged finished surfaces to match factory-applied finish.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the contract, including General and Supplementary Conditions and Specification Sections, apply to this Section.

1.2 SUMMARY

This Section includes the following:

- Fire Training Tower.
- Design requirements.

1.3 RELATED SECTIONS

The following Sections contain requirements that relate to this section:

1.4 REFERENCES

1.4.1 American Iron and Steel Institute (AISI):

"Specification for the Design of Cold-Formed Steel Structural Members."

1.4.2 American Institute of Steel Construction (AISC):

"Manual of Steel Construction", Allowable Stress or Load and Resistance Factor Design.

1.4.3 American Society for Testing and Materials (ASTM) Publications:

ASTM A-36 "Standard Specification for Carbon Structural Steel"

ASTM A-123 "Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products"

ASTM A-653 "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process"

ASTM A924 "Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process"

1.4.4 National Fire Protection Association (NFPA):

NFPA 1402 – "Guide To Building Fire Training Service Centers"

NFPA 1403 – "Standard On Live Fire Training Evolutions"

1.4.5 Occupational Safety and Health Standards (OSHA):

29 CFR 1910.23 – "Guarding Floor, Wall Openings, and Holes"

29 CFR 1910.24 – "Fixed Industrial Stairs"

29 CFR 1910.27 – "Fixed Ladders"

1.5 DESIGN, DRAWINGS & DATA:

The supplier shall be responsible for providing the design exclusive of the foundation. Shall submit, as requested, structural calculations for review. Will, within 15 working days after the receipt of order, submit 2 sets of drawings detailing anchor bolt loadings and locations as well as general plans and elevations. Will submit 2 sets of assembly (steel erection) drawings and 2 sets of assembly manuals concurrent with the shipment of materials. Building parts shall each be identified by individual part numbers clearly written on or attached to the part. Part numbers shall coincide with the drawings.

1.6 DELIVERY, INSPECTION & STORAGE:

All components and accessories shall arrive via flat bed trailer. Materials for the burn room may arrive separately via common carrier. Inventory of delivered materials must be taken during delivery or shortly thereafter. Damage to, or shortages noted during delivery must be noted on the freight bill and reported at once to the manufacturer. All claims for damages or shortages must be reported within 48 hours of

delivery Security and materials protection in storage is the responsibility of the receiving party. Materials packaged in small cartons must be stored in a secured area to prevent theft and/or damage by the elements. Materials stored outside must be stacked on pallets and covered with suitable waterproof coverings (not plastic).

1.7 WARRANTY:

A. General Warranty

The tower supplier shall certify that the training tower and its components have been designed to meet the contract specifications. The tower supplier shall warrant the materials and components to be free of fabricating defects for a period of **one year** from the date of shipment. This warranty is limited to the replacement of defective parts, or at the tower supplier's option, authorization may be given to the PURCHASER to charge back to the supplier an agreed upon amount for extra fieldwork. The supplier will not ship replacement parts nor authorize extra work to any party other than the ORIGINAL PURCHASER. Any pre-engineered structure will require the erector to furnish a certain amount of field fabrication and / or modifications as stated in the manufacturer's handbook. Sections of work requiring field cutting or drilling are indicated on the drawings or in the assembly manual. Other field modifications may be necessitated by site conditions beyond the manufacturer's control. The foregoing are not subject to warranty.

B. Burn Room Insulation Warranty

The burn room wall and ceiling insulation system shall be covered by a **15 year** limited warranty that provides coverage against a break in the thermal barrier caused by cracking, breaking, and spalling. This warranty is to apply to products under normal use and recommended service temperatures - but shall also include damage that has been caused by thermal expansion, thermal contraction, impact load, and thermal shock. This warranty is to be limited to component replacement or repair of defective components at the manufacturer's option. The replacement cost of the materials shall not be prorated over the warranty period itself (i.e., the supplier shall bear 100% of the material replacement cost for the duration of the warranty).

C. Paint Warranty

The paint system shall provide a 30/25 year limited warranty on paint finish, which includes chalking and breakdown of film integrity.

D. Structure Warranty

A 5-year limited warranty shall be provided on the structure itself.

1.8 SUBMITTALS:

A. GENERAL: Submit the following in accordance with the Conditions of the Contract and Division 1 Specification Sections:

- 1. PRODUCT DATA**, floor plans, elevations, catalog, general specifications, locations of similar projects completed.
- 2. SAMPLES** of the manufacturer's standard color charts covering both the siding colors and the door and window trim colors shall be furnished to the owner.

B. QUALITY ASSURANCE:

1. MANUFACTURER QUALIFICATIONS:

The manufacturer shall have a minimum of 10 years successful experience in designing and manufacturing Fire Training Towers of similar size and scope as project requires.

2. ENGINEERING PROFESSIONAL QUALIFICATIONS:

The engineering professional who designs the structure for the project must be registered in the State of the fire training tower's location and have successfully designed a minimum of 10 fire training towers. Upon request, the engineering professional shall submit an Engineering Qualifications Form stating his licensing number in the state of licensure, as well as listing a minimum of 10 fire training towers that he has designed and stamped.

3. ERECTOR QUALIFICATIONS: The erector shall provide evidence of successfully completing two Fire Training Towers of similar size and scope or shall be a certified Fire Facilities erector, as project requires.

1.9 PURPOSE:

This structure will be used to provide training for fire fighters and leaders in controlled environments, which replicate actual conditions.

1.10 GENERAL:

The tower shall utilize a structural steel frame system and curtain wall design. Structural framing systems are considered the norm for high-rise and commercial structures. The curtain wall/exterior wall panel design produces an ideal buffer or protection between the main structural frame of our building and any exterior elements, so that if an exterior wall panel is damaged (i.e., fire truck hits the side of the tower) no structural damage is likely to occur. This wall panel system also creates a flat surface ideal for ladder or rappelling anywhere on the tower to simulate actual street conditions.

1.11 STRUCTURAL INTEGRITY:

The wind loads, deck and the roof loads stated herein represent the standard criteria. Increased loadings, as may be dictated by local jurisdictions, will be accommodated. The primary structural system shall utilize hot-rolled structural steel column and beam frames sized to meet and exceed the loads as indicated. This training simulator shall be considered a nonbuilding structure for both code compliance and load interpretation. The primary and secondary structural system shall also meet and exceed the loads as indicated while maintaining a maximum deflection of L/240.

1.12 CODE COMPLIANCE:

The training simulator's primary structural and seismic design shall be in accordance with the building code having jurisdiction in the area of the project. Due to the nature of the intended use of these training towers, the stair design, the means of egress, fire wall requirements as well as other construction issues, are not expected to satisfy the criteria of buildings intended to accommodate public occupancy. This may require a building code variance in some locations; however, this simulator shall meet all applicable NFPA and OSHA standards. It is the responsibility of the owner to obtain such variance if required.

PART 2-DESCRIPTION

FIRE TRAINING SIMULATOR

2.0 MATERIALS:

All materials shall be new and shall conform to applicable ASTM specifications. All structural or nonstructural materials used, 10 gauge or less in thickness, whether exposed or not to the elements shall be **hot-dipped galvanized. When any mention of galvanized is noted within these specifications, it shall be implied to mean hot-dipped galvanized.** Any exposed material which is not galvanized, shall be given one coat of shop paint.

2.1 FASTENERS:

All fasteners utilized with galvanized steel panels not exposed to the elements shall be electro-galvanized. All exterior fasteners shall be furnished with a contained EPDM washer under the head for sealing. Structural columns and beams shall be field bolted with (A325) 5/8" diameter electro-galvanized bolts or larger. Anchor bolts shall be furnished by the concrete contractor, unpainted and of the size specified on the anchor bolt plan.

2.2 WEATHER SEALING:

All joints in weather tight areas are to be sealed with tape caulk or foam closures as specified on the building plan. Because of the intended use water tightness of simulators is not required or assured.

2.3 ROOF SYSTEMS:

Roofs shall be decked with 30" or 36" wide, 18 ga. unpainted galvanized 18 gage steel deck per **ASTM A-653, class G60** with recessed fasteners and shall meet the stated design load. Panels must have 6" on center cell spacing with an actual 4 1/4" flats with an actual 1 3/4" wide recesses and a maximum of 1 1/2" deep recesses. Panels must be roll formed.

2.4 EXTERIOR WALL SYSTEM:

Wall panel/curtain wall system shall provide for a concentrated rappelling/ladder load of 890 pounds while the primary structural framing supporting this wall system shall provide for a concentrated point load of 2300 pounds. **Rake trims, parapet rake trims, and window opening sill trim corners shall be beveled to prevent rope chafing, personal injury, or equipment damage.**

2.5 WALL PANELS:

The exterior wall panels shall be essentially flat to allow for safe laddering and rappelling anywhere on the simulator without the requirement of additional exterior surface plates to form a flat surface. The exterior wall panels shall be of 18 ga. hot-dipped galvanized steel per ASTM A-924, class G-90. Panels shall have nominal 4 3/4" flats with a maximum 1 1/8" wide recesses and shall be set in the horizontal plane. Since panels are set in the horizontal plane, sealants are not required to make this structure weather tight (sealants in extreme temperature environments will breakdown prematurely). Panels must be brake formed to provide a maximum 1/8" inside radius. All end joints of all panels must be backed by a splice panel, which extends a minimum of 12" either side of the joint (24" total). Exterior walls panels shall be painted from the customer's choice of the manufacturer's available colors.

The interior wall panels shall be corrugated for added strength and durability. The interior wall panels consist of hot-dipped galvanized steel per ASTM A-924. The interior wall panels shall have a 3/4" deep maximum corrugation at 3 1/2" on center and shall be set in the vertical plane. Interior wall panels shall be painted white.

Painted wall panels (interior and exterior) shall be manufactured from coil coated steel meeting ASTM A-924, hot-dipped galvanized, and painted with a **paint system on both sides** of the panel. The base coat

shall be a 0.2 to 0.25 mil coat of a polyurethane primer. The topcoat shall be a 0.7 to 0.8 mil coat of silicon protected polyester on the face side. The paint, on both sides of the panel, is to be baked on. The finished surfaces are to have a light wax coating applied after painting.

2.6 SECONDARY WALL FRAMING:

Wall framing shall be of conventional steel stud construction. Studs are to run vertically to represent common stud construction and be spaced at no more than 24 inches on center. Stud size and gage shall be determined by the design engineer, and shall accommodate all design criteria stated in other sections of this specification. All rough openings shall be framed in the conventional manner and provide fastening surfaces for all interior and exterior finishes and trims as provided with the building system.

2.7 SECONDARY ROOF FRAMING:

Roof framing shall be of conventional steel joist construction. Joists are to be spaced at no more than 24 inches on center and shall have a maximum span length of 14 ft. All rough openings shall be framed in the conventional manner and provide fastening surfaces for all floor and roof decks as provided with the building system.

2.8 WINDOW & DOOR LOCATIONS:

Window and door locations indicated on the drawings are suggested only. All such openings are to be field cut and with the exception of the stair wall, may be located according to preference.

2.9 WINDOW SHUTTERS:

All window openings shall be provided with a swinging shutter of the proper size for the opening. Framed opening studs/jambes shall be 16 ga. galvanized steel. Shutters for all areas shall be made with double skins of 18 ga. galvanized steel per ASTM A-924. Shutters will be provided as a 1-3/8" thick factory welded hollow metal assembly with a minimum of 3 vertical interior hat channel stiffeners and a 14 ga. hinge reinforcement. The hinges shall be ball-bearing swaged mortise mount, 4" x 4" x 5/32" thick stainless steel, commercial grade, and provided with the appropriate quantities per shutter (see paragraph below). A hollow metal welded assembly shall be used to prevent premature temperature warping that occurs on single panel/sheet shutters. Galvanized shutters are required to prevent premature rusting. All shutters shall be provided with a galvanized hold open latch.

Shutters for all areas except the burn room shall have two heavy-duty hinges. Shutters for the burn room areas shall have three heavy-duty hinges. In addition, burn room shutters shall be protected with a 1" thick Westemp insulation panel mounted on the inside of the burn room.

2.10 DOORS:

Doors for all areas except for burn areas shall be double skins of 18 ga. galvanized steel (total thickness), per ASTM A-924, and shall be an insulated hollow metal swing doors with 3 stainless steel ball-bearing hinges and full weather stripping. Framed opening studs/jambes shall be 16 ga. galvanized steel. This 1 3/4" thick door shall have a baked-on enamel finish and will include a lockset. Locksets shall meet ANSI A156.2 Series 4000 Grade 2 certifications and shall be keyed alike. Doors on 1st floor mounted at top of curb shall include a door sweep to allow for hose advancement even when door is closed to exterior of tower.

Doors for the burn areas shall be made with double skins of 18 ga. galvanized steel per ASTM A-924 with four heavy-duty hinges. The hinges shall be ball-bearing swaged mortise mount, 4" x 4" x 5/32" thick stainless steel, commercial grade. Doors will be provided as a 1-3/8" thick factory welded hollow metal assembly with a minimum of 3 vertical interior hat channel stiffeners and a 14 ga. hinge reinforcement. A

hollow metal welded assembly shall be used to prevent premature temperature warping that occurs on single sheet doors. Galvanized doors are required to prevent premature rusting. Framed opening studs/jambs shall be 16 ga. galvanized steel. Doors shall be provided with a galvanized hold open latch, a 6 ½" door pull, and an adjustable spring closure. Door sweep is to be provided to allow hose advancement even when door is closed to exterior of burn room. In addition, burn room doors shall be protected with 1" thick Westemp insulation panels mounted on the inside of the burn room.

2.11 PARAPET WALLS:

Parapet walls, if utilized, shall be designed to resist a load of 50 lb/ft and a concentrated point load of 200 lbs in any direction at the top. This wall shall incorporate a minimum of 12 ga. galvanized studs at one foot on center with 18 gage wall panels installed on both sides. The parapet shall incorporate an integral draining system that provides for uniform drainage without the need for a concrete roof covering.

2.12 SECONDARY FLOOR SYSTEM:

Interior decks shall be of six inch wide, unpainted 18 ga. **slip resistant galvanized** steel per **ASTM A-924, A-60** with recessed fasteners and shall meet the stated design load. Panels must have nominal 5" flats with a maximum 1" wide by 1" deep recesses (maximum 1" recess is required to prevent potential injuries). Panels must be brake formed at 90 degrees and provide inside radiuses no greater than 1/8". All floor and roof decks shall be framed with light gage steel "C" joists spaced at no more than 24 inches on center and shall have a maximum span length of 14 ft. Joists size and gage shall be determined by the design engineer, and shall accommodate all design criteria stated in other sections of this specification. Concrete floor covering is not required in non-burn room areas due to the safe (no large recesses to twist ankles or injure knees) and user-friendly floor panels specified. Toe kicks shall be installed around the entire perimeter of each floor to prevent potential injuries due to exposed openings to floor below. Concrete floor covering can be specified for the entire floor system while still maintaining stated design live loads. All burn room areas shall have concrete floor covering as specified below. Concrete floor covering is by others.

If concrete floor covering is specified, the concrete shall be a minimum of 1 1/2" thick and shall be fiber reinforced. The concrete shall be pitched toward exterior walls and doors. Even with concrete covering, the steel floor panels, located below, shall alone be designed to carry all of the required loads and shall still be a minimum of 18 ga. thick galv. steel. Concrete is prone to damage in high temperature burn areas and in unheated structures due to freeze/thaw conditions, therefore concrete cannot be used to increase the design strength of the steel floor panels/decks in fire training structures.

2.13 STAIRS AND ACCESSORIES:

A. Stair widths shall be 3'-8" wide and shall include handrails, guardrails, and steel bar grate approach landings. Steel bar grate approaches are provided for safety concerns (i.e., trainee in low visibility environments can "feel" stair approach). Stringers shall be plate, treads and platforms of bar grate risers to be open. Bar grate treads (19W4 x 1" deep) are to be factory attached to the stringers and shall include a diamond plate nosing. Stairs shall be designed to resist a minimum loading of 100 psf and a minimum concentrated load of 300 lbs at the center of any treadspan.

B. Handrails and guardrails shall consist of schedule 40 - 1 1/4" i.d. (1.66" o.d.) round pipe and the openings between rails shall not exceed 12" (minimum of three horizontal rails required). Handrails and guardrails shall be designed to resist a concentrated point load of 200 lbs in any direction at the top. Handrails shall be an all factory welded assembly. Guardrails shall have a factory welded post assembly to allow for the attachment of horizontal rails and shall be a minimum of 42" high. Rail extensions are not to be utilized.

C. Stairs, stringers, handrails, guardrails, bar grating, ladders, and platform frames shall be hot-dipped galvanized per ASTM A-123. All welds, holes, cutting, and bending must be made prior to hot-dip galvanizing.

2.14 WH-3S/LIEUTENANT FEATURES:

A. TOWER SECTION

18'-0" x 16'-0" x 34'-0"
Flat roof
Wind load 90 MPH
Roof live load 100 PSF
Interior stairs to the 3rd floor level
Interior fixed ladder, 3rd floor to attic
3' x 4' window openings w/ steel shutters (see drawings for Qty.)
3' x 2'-6" window openings w/ steel shutters (see drawings for Qty.)
3' x 7' exterior steel door (see drawings for Qty.)
4' x 4' roof chop-out curb, 12 ga. galvanized (see drawings for Qty.)
Parapet roof guard with exclusive roof drainage to the exterior of the building with a chain opening

B. BURN ROOM (ANNEX)

14'-0" x 16'-0" x 9'-10" High
½" in 12" single pitch roof
Wind load 90 MPH
Roof live load 100 PSF
3' x 4' window openings with steel shutters (see drawings for Qty.)
3' x 7' exterior metal door (see drawings for Qty.)
3' x 7' interior metal doors (see drawings for Qty.)
Westec insulation system & temperature monitoring system.

2.15 STAINLESS STEEL BURN ROOM INSULATING SYSTEM:

Two-inch thick insulating blankets with a protective skin of stainless steel face panels are to be provided for the interior walls and ceiling for the burn areas (precut to length - field cut at door and window openings). The doors and window shutters shall be protected with a minimum of one-inch thick burn room insulating panels (precut to fit).

The insulating blankets shall be rated for 2300 degrees F. and shall be unaffected by the application of water. The insulation blankets shall not crack or break, shall be free from asbestos, and shall not produce toxic byproducts in the course of the intended use. The two-inch thick insulation blankets shall have a maximum K value of 0.74 at 1200 degrees F and 0.48 at 800 degrees F (please note – smaller K values denote better insulating values of the system).

The face panels shall have a ¼" maximum corrugation at 3 ½" on center to allow for lateral expansion when exposed to high temperatures. The base material, of the face panels, shall consist of type 304 stainless steel for corrosion protection and thermal performance at high temperatures. These panels shall attach to thermally protected channels with stainless steel screws. Stainless steel trims (type 304) shall protect all wall and door/shutter opening corners. All face screws exposed to fire shall be stainless steel and these screws shall not protrude through the backside of the insulating blanket (through screws are not permitted for maximum thermal protection).

The stainless steel face panels shall not be restrained from expanding at high temperatures, but rather the integral system shall be designed to accommodate the panel movements without creating any buckling or warping of the panels. All panels and trims shall be screw attached to allow for easy maintenance or inspection without disrupting the systems ability to move; welded panels are not allowed. Trims are to be designed to accommodate thermal expansion either through the use of slip connections or planned deformations.

Doors and window shutter insulation panels shall be pre treated water resistant, free from asbestos and shall not produce toxic byproducts in the course of the intended use. Insulation panels shall withstand a constant temperature of 1200 degrees F. and shall be unaffected by the application of water.

Temperature Summary

1. Maximum safe training temperature for life safety is 1200 degrees F (continuous)
2. Maximum service temperature for the insulation panels (doors and window shutters) is 1200 degrees F (continuous)
3. Maximum service temperature of the wall and ceiling insulating system is 1850 degrees F (continuous)
4. Maximum insulating blanket service temperature is 2300 degrees F (continuous)

2.16 INTEGRATED TEMPERATURE MONITORING SYSTEM:

Three temperature sensing devices/thermocouples are to be provided for the interior of each burn room. The thermocouples shall be grounded and consist of fiberglass insulated wiring with sealed stainless steel probes. The fiberglass insulated wires shall be further protected by a stainless steel overbraid for increased durability and protection. Ceiling thermocouples shall protrude into the area perpendicular to the ceiling while all stainless steel encased wall thermocouples shall only run parallel to the walls for safety concerns.

Temperature monitoring shall be sustained with a multiple input, LCD display pyrometer. The pyrometer shall be connected to thermocouples, which are located within the burn areas for temperature reading, and mounted in a lockable NEMA 3R weatherproof box. This pyrometer shall display all attached thermocouple temperatures simultaneously, continually display the maximum peak temperature, have touch sensitive buttons, include a backlight, and have an onscreen programming menu. The pyrometer shall have an internal audio alarm along with the ability to connect external devices (i.e., external audio and visual alarms). Temperature limits shall be user programmable to enable alarms. The pyrometer shall also be capable of data logging which shall include: 72 hour training memory with time and date stamp, onscreen viewing of data, download capabilities of data via infrared interfacing to handheld module. This handheld data acquisition module's data can then be brought to an offsite Windows based computer for download via the SD/SDHC data storage card provided.

2.17 SUPPLIERS/SYSTEMS:

A. Acceptable Suppliers/Systems: Fire Facilities, Inc.[®], 314 Wilburn Road, Sun Prairie, WI, 53590, Phone: 800/929-3726 or 608/327-4100, Fax: 866/639-7012 or 608/834-1843, E-mail: info@firefacilities.com, Website: www.firefacilities.com

B. Alternate Suppliers/Systems: Any systems/materials not explicitly meeting the specifications stated herein, shall be pre-approved fourteen days prior to the bid due date. For all systems/materials in question, the supplier/contractor shall provide samples, written specifications, burn room insulation thermal performance values, warranties, full set of drawings, and MSDS. An itemized list must be provided that specifically references each item that deviates from this specification. In any case, all performance and warranty criteria stated herein must be met without exception.

PART 3-EXECUTION

3.1 GENERAL

Comply with the manufacturers recommendations for preparation and storage of the tower components.

3.2 EXAMINATION

Verify that concrete work has cured a minimum of 14 days. Verify that anchor bolts are at the proper spacing and protrude the proper amount above the concrete. Report any variances to the owner's representative prior to proceeding with erection.

3.3 ERECTION

Follow the details supplied by the manufacturer. Report any discrepancies to the manufacturer prior to proceeding.

3.4 FIELD QUALITY CONTROL

A. DEFECTIVE WORK

Materials, components and assemblies not complying with the manufacturer's installation recommendations shall be repaired or replaced, at the option of the manufacturer.

B. INSPECTION

Verify that all bolted connections are tight, self-drilling screws with integral washers are seated snugly without washer distortion and rivets have not pulled through the attached materials. Replace improperly set or damaged fasteners.

Inspect all panels, trims and accessories for proper installation and fit. Replace any item which is damaged, warped or distorted. Insure that all field mitered corners fit tightly and smoothly.

C. ADJUSTING

Adjust all shutters, swing doors and hatches so that they swing smoothly without binding and so that the appropriate hardware latches without forcing or slamming. Insure that all closures are adjusted so that they close smoothly.

Check all electrical and mechanical devices to make sure that they are working properly. Temperature monitoring systems must be checked to see that each thermal-couple works accurately. Fans must be tested and demonstrated as working at all speeds.

D. CLEAN-UP

At the end of each day check the site and pick all debris and garbage. Insure that all materials are secured in a neat and orderly fashion.

Thoroughly clean the tower inside and out at the completion of the erection process to remove all debris, garbage, packing materials, metal shavings and dirt.

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal Building System:
 - 1. Structural steel framing system.
 - 2. Metal roof system.
 - 3. Metal wall system.
 - 4. Roof and wall insulation systems.

1.2 RELATED REQUIREMENTS

- A. Section 05120 Structural Steel.
- B. Section 07412 Metal Roof Panels

1.3 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC):
 - 1. AISC 360 - Specification for Structural Steel Buildings.
 - 2. AISC 341 – Seismic Provisions for Structural Steel Buildings (when appropriate).
 - 3. AISC Design Guide 3 – Serviceability for Steel Buildings
- B. American Iron and Steel Institute (AISI):
 - 1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- C. American Welding Society (AWS):
 - 1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
 - 2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel.
- D. Association for Iron & Steel Technology (AISE):
 - 1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
- E. ASTM International (ASTM):
 - 1. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - 2. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 4. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 5. ASTM C 1363 – Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus.
 - 6. ASTM D 523 – Standard Test Method for Specular Gloss.

7. ASTM D 2247 – Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
8. ASTM D 3361 – Standard Practice for Unfiltered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
9. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
10. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
11. ASTM E 1592 – Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
12. ASTM G 87 – Standard Practice for Conducting Moist SO₂ Tests.

F. Metal Building Manufacturers Association (MBMA):

1. MBMA Metal Building Systems Manual.
2. Seismic Design Guide for Metal Building Systems.

G. North American Insulation Manufacturers Association (NAIMA):

1. NAIMA 202 – Standard For Flexible Fiber Glass Insulation to be Laminated for Use in Metal Buildings.

H. The Society for Protective Coatings (SSPC):

1. SSPC-Paint 15 - Primer for Use Over Hand Cleaned Steel performs to SSPC-Paint 15 standards.
2. SSPC-SP2 – Hand Tool Cleaning.

I. Underwriters Laboratories (UL):

1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies.
2. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.

1.4 PREINSTALLATION MEETINGS

- A. Convene preinstallation meeting 2 weeks before start of installation of metal building system.
- B. Require attendance of parties directly affecting work of this section, including Contractor, Architect, Engineer, installer, and metal building system manufacturer's representative.
- C. Review materials, installation, protection, and coordination with other work.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – 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 “Certificate of design and manufacturing conformance” prepared and signed by a Professional Engineer, registered to practice in Georgia 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, snow 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.
 - 2. Submit certification ~~4 week before bid date~~ during submittal process on the metal building system manufacturer’s letterhead.
- E. Submit certification verifying that the metal roof system has been tested and approved by Underwriter’s Laboratory as Class 90.
- F. Dealer Certification: Submit certification 1 week before bid date that the metal building system supplier or metal roof system supplier is a manufacturer’s authorized and franchised dealer of the system to be furnished.
 - 1. Certification shall state date on which authorization was granted.
- G. Installer Certification: Submit certification 1 week before bid date that the metal building system or roof system installer has been regularly engaged in the installation of building systems of the same or equal construction to the system specified.
- H. Warranty Documentation: Submit manufacturer’s standard warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer’s Qualifications:
 - 1. Manufacturer regularly engaged, for past 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.
- B. Installer’s Qualifications:
 - 1. Installer regularly engaged, for past 5 years, in installation of metal building systems of similar type to that specified.
 - 2. Employ persons trained for installation of metal building systems.
- C. Certificate of design and manufacturing conformance:
 - 1. Metal building system manufacturer shall submit written certification prepared and signed by a Professional Engineer, registered to practice in Georgia verifying that 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.
 - 2. Certification shall reference specific dead loads, live loads, snow 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.
 - 3. Certificate shall be on metal building system manufacturer’s letterhead.

4. Refer to Submittals article of this specification section.

D. Material Testing:

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).

1.7 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.

1.8 WARRANTY

A. Metal building system manufacturer shall provide a written weathertightness warranty for a maximum of 25 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.

1. Warranty shall be signed by both the metal roof system manufacturer and the metal roof system installer.
2. Maximum liability of warranty shall be no less than \$0.70 per square foot of roof area.

B. Metal building system manufacturer shall provide a written warranty for 25 years against perforation of metal roof panels due to corrosion under normal weather and atmospheric conditions.

1. Warranty shall be signed by metal roof system manufacturer.

C. Metal building system manufacturer shall provide a paint film written warranty for 25 years against cracking, peeling, chalking, and fading of exterior coating on painted roof and wall panels.

1. Warranty shall be signed by metal building system or roof system manufacturer and state that the coating contains 70 percent "Kynar 500" or "Hylar 5000" resin.
2. Metal building system manufacturer shall warrant that the coating shall not peel, crack, or chip for 25 years.
3. For a period of 25 years, chalking shall not exceed ASTM D 4214, #8 rating and shall not fade more than 5 color difference units in accordance with ASTM D 2244.

- D. Metal Building System Manufacturer's Certification: Metal building system manufacturer shall submit a signed written Certification 1 week before bid date, stating that the metal roof system manufacturer or approved representative will provide warranties and Inspection and Report Service specified in this specification section.
1. Warranty terms shall be submitted with bid.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Metal Building System Manufacturer:
1. Butler Manufacturing: PO Box 419917, Kansas City, Missouri 64141. Phone 816-968-3000. Website www.butlermfg.com.
 2. Rigid Gopal Buildings: Regional Sales Office – 9250 East Costilla Ave, Suite 325 Greenwood Village, CO 80112 - Toll Free (800) 658-2885, Phone (303) 799-4579, Fax (303) 799-3677
 3. Nucor Building Systems: P.O. Box 1006, 200 Whetstone Rd, Swansea, SC 29160, phone: (888) 503-2845 fax (803) 568-2121
- B. Systems and products specified below are the Basis of Design requirements. Provide products and/or systems as indicated or approved equivalent.

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 Beams: Indicated on the Drawings.
- B. Primary Structural Members:
1. Primary Framing System: Butler Manufacturing 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: Butler Manufacturing framing system as specified in this specification section.
 2. a. C/Z Purlins and Girts: Acrylic-coated G30 galvanized finish.
b. Truss Purlins: Acrylic-coated G30 galvanized finish.
- D. Metal Roof System: Butler Manufacturing metal roof system as specified in this specification section.
- E. Metal Wall System: Butler Manufacturing metal wall system as 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 STRUCTURAL STEEL FRAMING SYSTEM

- A. General:
1. Design of Structural System: Clear or multi-span rigid frame with tapered or 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. Roof Slope: 3 inch in 12 inches.
 5. 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.
 6. 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.
 - 1) 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, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
 - 2) 7-inch, 8-1/2-inch, 10-inch, or 11-1/2-inch-deep "Z" sections.
 - 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 7-inch, 8-1/2-inch, 10-inch, or 11-1/2-inch-deep "C" sections, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.

3. Girts:
 - a. "Z" or "C"-shaped, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
 - b. 7-inch, 8-1/2-inch, 10-inch, or 11-1/2-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) Hot-rolled rods of sizes indicated on the Drawings.
 - 2) 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 for wall rod bracing on buildings 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 gray water-reducible alkyd primer paint formulated to equal or exceed performance requirements SSPC-Paint 15.
 - c. Minimum Coating Thickness: 1.0 mil.
3. Secondary Structural Members – Roll-Formed:
 - a. Hot-dipped zinc coating, ASTM A 653, G30; followed by 1 coat of clear acrylic finish.
 - b. Acrylic-Coated G30 Galvanized Steel: Equal or exceed performance requirements of SSPC Paint-15.
4. Truss Purlins:
 - a. Hot-dipped zinc coating, ASTM A 653, G30; followed by 1 coat of clear acrylic finish.
 - b. Acrylic-Coated G30 Galvanized Steel: Equal or exceed performance requirements of SSPC Paint-15.

2.4 METAL ROOF SYSTEM

- A. Metal Roof System: Butler Manufacturing "VSR II™" roof system.

- B. Roof System Design:
 - 1. Design roof panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 2. Design roof paneling system and attachments to support design live, snow, and wind loads.

- C. Roof System Performance Testing:
 - 1. UL Wind Uplift Classification Rating, UL 580: Class 90.
 - 2. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E 1592.
 - 3. Roof system has been tested in accordance with U.S. Army Corps of Engineers Unified Facilities Guide Specification Section 07 61 13.
 - 4. FM Global (Factory Mutual):
 - a. Roof system has been tested in accordance with FMRC Standard 4471 and approved as a Class 1 Panel Roof.
 - b. Metal Building System Manufacturer: Provide specific assemblies to meet required wind rating in accordance with FM Global.
 - c. Installation modifications or substitutions can invalidate FM Global approval.

- D. Roof Panels:
 - 1. Factory roll-formed, 16 inches wide, with 2 major corrugations, 2 inches high, 16 inches on center, and with minor longitudinal striations in the flat of the panel.
 - 2. Due to steel mill tolerances, slight waviness known as "oil canning" may appear in erected panels.
 - 3. Panel Material and Finish:
 - a. 24-gauge painted Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc), ASTM A 792.
 - b. Paint with exterior colors of "Butler-Cote™" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.
 - c. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years for the following.
 - 1) Not to peel, crack, or chip.
 - 2) Chalking: Not to exceed ASTM D 4214, #8 rating.
 - 3) Fading: Not more than 5 color-difference units, ASTM D 2244.

- E. Insulation:
 - 1. Faced Blanket Insulation in Specified Thickness: Use with option of using thermal blocks to eliminate "thermal short circuits".

- F. Provision for Expansion and Contraction:
 - 1. Provision for Thermal Expansion and Contraction Movement of Roof Panels: Clips with movable tab.
 - a. Tabs: Factory centered on roof clip to ensure full movement in either direction.
 - 2. Roof: Provide for thermal expansion and contraction without detrimental effects on roof panels, with plus or minus 100-degree F temperature difference between interior structural framework of building and roof panels.

- G. Fasteners:
 - 1. Make connections of roof panel clips to structural members with self-drilling fasteners.

- a. Self-drilling fasteners attach concealed clips to secondary structural members.
2. Make roof panel side laps with field-formed lock seam, formed by a machine seaming device.

H. Accessories:

1. Accessories (i.e., ventilators, skylights, eave and gable trim, gutters, jacks, and curbs): Standard with metal building system manufacturer, unless otherwise noted and furnished as specified.
2. Metal Coating on Gutters, Downspouts, Gable Trim, and Eave Trim: "Butler-Cote™" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.
3. Location of Standard Accessories: Indicated on erection drawings furnished by metal building system manufacturer.

I. Energy Conservation:

1. Insulate roof panel support structural members to eliminate "thermal short circuits" between structural members and roof panels.
2. Eliminate heat loss (thermal short circuit) caused by compression of insulation between structural members and roof panels by use of thermal block at each structural support location.

2.5 METAL WALL SYSTEM

A. Exterior Metal Wall System: Butler Manufacturing™ "Butlerib® II" wall system.

B. Wall System Design: Design wall panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.

C. Wall Panels:

1. Roll-formed panels, 3 feet wide with 4 major corrugations, 1-1/2 inches high, 12 inches on center, with 2 minor corrugations between each of the major corrugations entire length of panel.
2. One piece from base to building eave.
3. Upper End of Panels: Fabricate with mitered cut to match corrugations of "Butlerib® II" roof panels of 1/2 inch to 12 inches and square cut for all other roof panels and slopes.
4. Factory punch or field drill wall panels at panel ends and match factory-punched or field-drilled holes in structural members for proper alignment.
5. Panel Material and Finish:
 - a. 26-gauge or 24-gauge painted Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc), ASTM A 792.
 - b. Paint with exterior colors of "Butler-Cote™" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating.
 - c. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years for the following.
 - 1) Not to peel, crack, or chip.
 - 2) Chalking: Not to exceed ASTM D 4214, #8 rating.
 - 3) Fading: Not more than 5 color-difference units, ASTM D 2244.

D. Fasteners:

1. Wall Panel-to-Structural Connections: Torx-head “Scrubolt™” fasteners.
2. Wall Panel-to-Panel Connections: Torx-head self-drilling screws.
3. Fastener Locations: Indicated on erection drawings furnished by metal building system manufacturer.
4. Exposed Fasteners: Factory painted to match wall color.

E. Accessories:

1. Accessories (i.e., doors, windows, louvers): Standard with metal building system manufacturer, unless otherwise noted and furnished as specified.
2. Location of Standard Accessories: Indicated on erection drawings furnished by metal building system manufacturer.

2.6 INSULATION

A. Laminated Fiberglass: Owens-Corning Fiberglas, NAIMA 202, “Certified R” metal building insulation.

1. TIMA Insignia and Insulation Thickness: Ink-jet printed on fiberglass.

B. Back-Fill Insulation: Owens-Corning Fiberglas unfaced “Pink Metal Building Insulation Plus”.

C. Roof Insulation:

1. Nominal Thickness: 9 1/2 inches.
2. Certified R-Value: 30.

D. Wall Insulation:

1. Nominal Thickness: _____ inches.
2. Certified R-Value: 19.

E. Roof and Wall Insulation Facing: R-3035 HD (FSK-HD) (Silver).

1. 0.0003-inch-thick, aluminum foil laminated to 30-pound Kraft paper, reinforced with glass-fiber scrim, in unpainted (Aluminum Adhere facing to Owens-Corning Fiberglas “Certified R”, NAIMA 202, fiberglass blanket
2. Assembly of Insulation Blanket and Facing:
 - a. Flame Spread Rating: Less than 25.
 - b. UL Label: Submit as specified in Submittals article of this section.
 - c. Facing Perm Rating: 0.02.

2.7 INSULATION SUPPORT SYSTEM

A. Insulation Support System: Butler Manufacturing™ “Sky-Web®” insulation support system.

B. Description:

1. 1,000 denier polyester yarn interwoven on nominal 1/2-inch-square grid coated with fire-retardant, UV-stabilized, PVC-based binder.
2. Polypropylene tape bindings on all 4 edges.
 - a. Two Edges that Attach to Building Eave Members: Reinforce with 1/4-inch-diameter polypropylene rope.
3. Furnish in building bay lengths by building widths.
 - a. Cover 1 bay of building length.

- b. Extend eave-to-eave across building.

C. Physical Properties:

- 1. Tensile Strength (pounds/yarn):
 - a. Machine Direction: 15 pounds.
 - b. Cross Direction: 15 pounds.
- 2. Ends per Inch:
 - a. Machine Direction: 2.5.
 - b. Cross Direction: 2.0.
- 3. Weight: 0.28 to 0.32 ounces per sq ft

D. Fasteners and Attachment Hardware:

- 1. Connections to Eave Members: Steel strapping and self-drilling screws.
- 2. Mesh-to-Insulation Support System Edge Connections: Plastic cable ties.

E. Fire-Hazard Classification:

- 1. UL Fire-Hazard Classification Ratings, UL 723:
 - a. Flame Spread: 15.
 - b. Smoke Developed: 400.

2.8 METAL COATING SYSTEM

- A. Metal Coating System: Butler Manufacturing™ “Butler-Cote™” finish system a factory-applied, exterior metal coating system

B. Substrate Preparation:

- 1. G90 Hot-Dipped Galvanized Steel or AZ50 Galvalume: Factory-controlled chemical-conversion treatment.

C. Coating:

- 1. Material: Full-strength, 70 percent, “Kynar 500” or “Hylar 5000” fluoropolymer (PVDF) color coating.
- 2. After steel preparation, coat exterior exposed surface with primer and PVDF
 - a. Nominal Total Dry Film Thickness: 1.0 mil.
- 3. Interior Exposed Surfaces: Coat with polyester color coat.
- 4. Apply coatings to entire material dimensions of steel sheets before forming of panels.

D. Physical Characteristics of Exterior Coating:

- 1. Resistance to failure through cracking, checking, peeling, and loss of adhesion.
- 2. Measure by the following laboratory weather-simulating tests to obtain test results justifying metal building system manufacturer's 25-year warranty:
 - a. Humidity resistance at 100 degrees F and 100 percent relative humidity, ASTM D 2247.
 - b. Salt-spray resistance at 5 percent salt fog, ASTM B 117.
 - c. Reverse impact resistance, ASTM D 2794.
 - d. Resistance to accelerated weathering, Atlas Model XW-R Dew Cycle Weather-O-Meter, ASTM D 3361.
 - e. Resistance to dry heat.
 - f. Abrasion resistance, ASTM D 968.
 - g. Chemical/acid/pollution resistance, ASTM D 1308 and G 87.

- h. Maintain gloss of finish evenly over entire surface, ASTM D 523

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine area to receive metal building system.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 ERECTION – STRUCTURAL STEEL FRAMING SYSTEM

- A. Erect structural steel framing system in accordance with the Drawings and metal building system manufacturer's erection drawings.
- B. Field Modifications:
 - 1. Require approval of metal building system manufacturer.
 - 2. Responsibility of building erector.
 - 3. Field Modifications to Truss Purlins: Not allowed, unless indicated on erection drawings furnished by metal building system manufacturer.
- C. Fixed Column Bases: Grout flush with floor line after structural steel erection is complete.

3.3 INSTALLATION – METAL ROOF SYSTEM

- A. Metal Roof System Installation: Butler Manufacturing™ “VSR II™” roof system.
 - 1. Install roof system in accordance with metal building system manufacturer's instructions at locations indicated on the Drawings.
 - 2. Install roof system weathertight.
 - 3. Attach roof panels to supporting structural members with seamed-in-clip device.
 - a. Install clip at panel major corrugation.
 - 4. Design roof panel side laps to be interlocking seams with return leg on lower edge of female rib.
 - a. Factory apply side lap sealant.
 - 5. Roof Panel End Laps:
 - a. Minimum of 6 inches.
 - b. Seal with field-applied sealant.
 - c. Swage 1 panel end to ensure nestible, watertight end laps.
 - d. Install backing plate directly over, but not fastened to, structural support members.
 - e. Self-Drilling Fasteners: Do not use to make panel end splices.

3.4 INSTALLATION – METAL WALL SYSTEM

- A. Metal Wall System Installation: Butler Manufacturing™ “Butlerib® II” wall system.
1. Install wall system in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.
 2. Install wall system weathertight.
 3. Verify structural system is plumb before wall panels are attached.
 4. Align and attach wall panels in accordance with erection drawings furnished by metal building system manufacturer.
 5. Install side laps with minimum of 1 full corrugation.
 6. Seal wall panels at base with metal trim and foam or rubber closures.
 7. Exterior Trim: Apply same finish as exterior color of wall panels, except the following:
 - a. Gutters, Downspouts, Eave Trim, Gable Trim, Door-Side Flashings, and Header Flashings: Paint with exterior colors of “Butler-Cote™” finish system, full-strength, 70 percent “Kynar 500” or “Hylar 5000” fluoropolymer (PVDF) coating in standard color of metal building system manufacturer.
 - b. Windows: Factory paint aluminum extrusions (thermally broken).
 8. Flashings, Trim, Closures, and Similar Items: Install as indicated on erection drawings furnished by metal building system manufacturer.

3.5 INSTALLATION – INSULATION

- A. Insulation Installation: Install insulation in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.

3.6 INSTALLATION – INSULATION SUPPORT SYSTEM

- A. Insulation Support System Installation: Butler Manufacturing™ “Sky-Web®” insulation support system.
1. Install insulation support system in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.
 2. Verify roof structural system is in place before installation of insulation support system.
 3. Keep insulation support system in place after metal roof system is installed.

3.7 INSTALLATION – ROOF INSULATION SYSTEM

- A. Roof Insulation System Installation: Butler Manufacturing™ “ThermaLiner™” roof insulation system.
1. Install roof insulation system in accordance with metal building system manufacturer’s instructions at locations indicated on the Drawings.
 2. Install roof insulation system on Butler Manufacturing™ “Widespan™” structural system.

3.8 PROTECTION

- A. 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