SECTION 13 31 33.00 22

PRE-ENGINEERED FRAMED FABRIC STRUCTURES
09/16
AMENDMENT 00004

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE (ACI)

ACI 318	(2014; Errata 1-2 2014; Errata 3-5 2015; Errata 6 2016; Errata 7-9 2017) Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7	(2017; Errata 2018; Supp 1 2018) Minimum Design Loads and Associated Criteria for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A325	(2014) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A500/A500M	(2020) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A615/A615M	(2020) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A780/A780M	(2020) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2018) International Building Code

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (2019) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Manufacturer's Qualifications; G

SD-02 Shop Drawings

Pre-Engineered Framed Fabric Structure; G

Lightning Protection System; G

Lighting System; G

Submit shop drawings signed and sealed by a Professional Structural Engineer.

SD-03 Product Data

Pre-Engineered Framed Fabric Structure; G

Lightning Protection System; G

LED luminaires; G

SD-04 Samples

Fabric Cover; G

Submit fabric samples for color selection and/or approval.

SD-05 Design Data

Pre-Engineered Framed Fabric Structure; G

Submit design calculations signed and sealed by the Professional Structural Engineer of Record.

Lightning Protection System; G

Lighting System; G

SD-10 Operation and Maintenance Data

Pre-Engineered Framed Fabric Structure; G

SD-11 Closeout Submittals

Record Drawings; G

1.3 QUALITY ASSURANCE

1.3.1 Products

The pre-engineered framed fabric structure is to be the product of a manufacturer who has had at least twenty (20) years experience in design, fabrication, erection, and service, and who is regularly engaged in the manufacture of the type of structures specified herein. Only manufacturers who can submit evidence of actual installations of comparable design and construction, and that the products have proven practical, durable, and require a minimum of maintenance, will be qualified under this specification. Submit manufacturer's qualifications and experience.

1.3.2 Installers

Installation of the pre-engineered framed fabric structure is to be by an authorized representative of the structure manufacturer and in accordance with approved design calculations and shop drawings. Provide mechanics skilled and experienced in the erection of structures of the type specified herein.

1.4 DELIVERY, STORAGE, AND HANDLING

The pre-engineered framed fabric structure manufacturer must provide shipment of all materials required for installation in protective packaging. Protect structure materials, fabric and accessories from damage during delivery, storage, and handling. Mark all packaging clearly with manufacturer's brand name and job site location. Store in dry location with adequate ventilation, free from dust and water. Storage must permit easy access for inspection and handling. Remove damaged items that cannot be restored to like new condition and replace with new items.

1.5 WARRANTY

Provide a warranty from the pre-engineered framed fabric structure manufacturer for all materials and workmanship for a period of thirty (30) years on the frame and twenty (20) years on the fabric canopy beginning from the date of final acceptance. Include in the warranty for fabric, failure due to deterioration, breakdown, mildew, heat, cold, fading or discoloration.

1.6 MAINTENANCE

Provide maintenance and cleaning instructions for fabric canopy. Provide instructions for periodic re-tensioning (if required).

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Pre-engineered framed fabric aircraft-type structures in size (each) as follows:

a. Overall exterior dimensions are as follows: 60 feet wide x ***60*** feet long with 30 feet - 6 inches exterior center height. Minimum interior clear dimensions are as follows: ***56*** feet wide with ***26*** feet interior clear center height. Minimum interior vertical clearance at the sidewall: ***18 feet***. Include with each structure four aluminum blast shields, 4 feet - 8 inches by 4 feet - 8 inches by 3/16 inch thick, fastened to the underside of the structure.

Structures include anchored tubular steel chord truss frame with a tensioned laminated fabric cover with a polyester scrim.

Any proposed deviations from the size indicated above are required to meet all airfield and airfraft clearance requirements.

2.1.1 Design Requirements

Design canopy structure(s) to resist wind load and seismic criteria as indicated on Structural drawings in accordance with ICC IBC and ASCE 7 requirements for Components and Cladding.

Provide pre-engineered framed fabric structures designed by a Professional Structural Engineer with a minimum of ten (10) years in the design and construction of framed fabric structures of the type specified herein.

2.2 STEEL STRUCTURES AND FRAMEWORK

2.2.1 Anchor System

Use Epoxy Adhesive anchors for existing concrete foundations (if occurring). New concrete foundations (where required) to be reinforced concrete designed to resist uplift forces. Provide 60,000 psi reinforcing steel per ASTM A615/A615M, Grade 60, and placed in accordance with ACI Detailing Manuals. Provide 3,000 psi minimum concrete mix in compliance with ACI 318.

The intent is to anchor structures to concrete apron pavement, provide details of anchorages and how joints in apron will be accommodated. Also provide calculations demonstrating adequacy of concrete pavement to support loads.

2.2.2 Tubular Steel Trusses and Connections

Use tubular steel trusses for main framing. Fabricate tubing from ASTM A500/A500M, Grade B steel and hot-dip galvanized conforming to ASTM A123/A123M.

Provide structural bolts that conform to ASTM A325. Provide all bolts with lock washers or locking nuts. Hot-dip galvanize all hardware conforming to ASTM A153/A153M.

Support trusses with rows of lateral x-bracing that connect at each truss with welded tabs.

Provide side and roof cables to provide additional strength to the frame system. Provide side cables with high visibility protection sleeves with reflective tape.

2.3 FABRIC COVER

2.3.1 Fabric Material

Provide a heavy-duty, PVC coated polyester fabric membrane with a demonstrated minimum field performance consistent with this structure's use, environment, and required warranty. Fabricate the fabric cover into one continuous panel that will cover the entire structure's length and width to the sidewall height indicated. Multiple section fabric covers are not acceptable.

Fabric weight is to be 28 oz. per square yard, 100-percent waterproofed with no track or keder system and laminated with a polyester 18 x 13 denier scrim. Provide flame retardant fabric conforming to NFPA 701.

Color of fabric will match existing sunshades on the airfield at MCAS Beaufort..

2.4 LIGHTNING PROTECTION SYSTEM

Provide Lightning Protection System in accordance with Specification Section 26 41 00 LIGHTNING PROTECTION SYSTEM, including air terminals, wiring, and ground rods in the each corner and middle of each side of each sunshade. Interconnect all ground rods with copper bonding conductors. Interconnect all air terminals with copper bonding conductors and provide copper down conductors to connect to the ground rods. Do not depend on the structural steel to provide the electrical path. Design to facilitate replacement of canvas without affecting the lightning protection system.

2.5 LIGHTING

Provide Lighting inside the fabric structure in accordance with Specification Section 26 51 00 INTERIOR LIGHTING. Provide LED luminaires suitable for wet locations. Provide lighting color temp of 5100 CCR. Lighting system must provide approximately even illumination of 25 footcandles at 3 feet above finished floor. Locate luminaires to avoid aircraft exhaust and blast shields.

PART 3 EXECUTION

3.1 INSTALLATION

Install and erect the canopy structure in strict accordance with approved shop drawings per manufacturer's instructions.

Conform to ground slope (if occurring) and site conditions, ensuring a uniform appearance throughout the installation.

Weld all metal to metal connections with certified welders with a minimum of five (5) years experience. Provide welds in accordance with AWS D1.1/D1.1M.

Space trusses at 10-feet on center unless otherwise required for design loading.

Form truss connections with plasma burnt plate to plate junctions using structural bolts, nuts and locking washers.

Tension fabric at the four corners of each structure with a ratchet and

cable system and attach longitudinally with cover tensioning tubes attached to the frame with all thread to frame connection.

Coat all weld joints or areas of damaged galvanizing with zinc cold galvanizing compound for corrosion protection. The repair to conform to ASTM A780/A780M. Provide Cold galvanizing compound that contains a minimum of 95 percent zinc dust in the dried film.

Place reflective tape on the four corners of the shelter to improve night visibility.

3.2 RECORD DRAWINGS

Provide record drawings of the pre-engineered framed fabric structure using the NAVFAC standard drawing format.

3.3 CONSTRUCTION WASTE MANAGEMENT

Comply with requirements of the Waste Management Plan specified in Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

-- End of Section --