

**SECTION 13 31 00  
PLAYGROUND SHADE STRUCTURES**

**PART 1 GENERAL**

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification sections, apply to work in this section.

1.2 SUMMARY

- A. The shade structure contractor shall be responsible for design, engineering, fabrication, and supply of the work specified herein.
- B. The intent of this specification is to have only one manufacturer responsible for all the functions.

1.3 REFERENCES

- A. ASCE 7 – Minimum Design Loads for Buildings and other Structures
- B. ASTM A135/A135M – Standard Specification for Electric Resistance Welded Steel Pipe
- C. ASTM A500/A500M – Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
- D. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- E. NFPA 701- Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
- F. FBC - Florida Building Code
- G. FFPC Florida Fire Prevention Code

1.4 SUBMITTALS

- A. Provide installed reference sites with structures for similar scope and installation engineered to the FBC requirements.
  - 1. Provide minimum of 5-references in Southeast Florida, preferably 5-years or more in age.
  - 2. Include in reference list of structure dimensions with install dates and project locations.
- B. Provide material samples and color available.
- C. Provide signed and sealed engineered drawings and structural calculations prepared by Florida licensed Engineer.
- D. Provide certification that the fabric meets NFPA 701 requirements.
- E. Provide a letter signed by the school principal stating conditions for fabric removal.
  - 1. Obtain a copy of a draft form letter from the District's Building Code Services Department.

1.5 WARRANTY

- A. The successful bidder shall provide a one-year warranty on all labor and materials.
- B. Provide a supplemental non-prorated 10-year warranty from the manufacturer on fabric including stitching and 20-years on the structural integrity of the steel, from date of substantial completion.
- C. The warranty shall not deprive the Owner of other rights under the provisions of the Contract Documents, are in addition to, and run concurrent with, other warranties made by the Contractor under requirements.

**PART 2 PRODUCTS**

2.1 GENERAL

- A. Design and manufacture the shade product to the most exacting specifications by skilled craftsmen, and certified by Professional Engineers for structural soundness of designs.
- B. Ship all shade products knocked-down, with complete assembly instructions, and ready for

easy in-field installation

- C. Engineer the structures to meet or exceed the requirements of the FBC.
  - D. Design to the following wind speeds:
    - 1. Frame only – Wind load per current wind map for Risk Category II, Exposure C.
    - 2. Frame w/canopy in place – 105 M.P.H., Risk Category II, Exposure C.
  - E. Material:
    - 1. All materials shall be structurally sound and appropriate for safe use.
    - 2. Ensure product durability by the use of corrosion-resistant metals such as stainless steel, and coatings such as zinc plating, galvanizing, and powder coating on steel parts, subject to the product-specific requirements.
    - 3. Use fabrics with UV-stabilizers and fire retardants for longevity and safety.
  - F. Packaging: Wrap all metal posts, rafters, and beams to protect the powder coat finish during shipping.
  - G. Weldments: Factory weld all tubing members using Certified Welders meeting American Welding Society (AWS) specifications and to the highest standards of quality workmanship.
    - 1. Finish the weldments with a zinc-rich galvanized coating.
    - 2. Minimize or omit field welding in the assembly of the shade products.
  - H. Posts, Structural Frame Tubing, and Hardware:
    - 1. Use cold-formed and milled tubing meeting ASTM A135/A135M and ASTM A500/A500M requirements.
    - 2. Test material in accordance with ASTM E8.
    - 3. Minimum yield is 40,000 psi, minimum tensile strength of 45,000 psi on all posts.
    - 4. Pre-cut all tubing to appropriate lengths, and galvanize all outside surfaces with an exterior corrosion-resistant zinc-rich coating.
    - 5. Where required, schedule-40 support pipes of hot-dip galvanized or powder-coated black steel.
    - 6. All fastening hardware shall be stainless steel.
  - I. Powder-coating Process:
    - 1. Completely clean and properly, pre-treat all powder-coated parts before coating.
    - 2. Apply powder coating electrostatically and oven-cured at 375 to 425 degrees Fahrenheit.
    - 3. Powders shall meet or exceed ASTM standards for Adhesion, Hardness, Impact, Flexibility, Overbake Resistance, and Salt Spray Resistance.
    - 4. Owner shall select color from manufacturer's palette.
  - J. Design the footings per the FBC for the specified structure.
  - K. Roofing:
    - 1. Design structural frames use with shade fabric.
    - 2. Attach the fabric to frame using a vinyl covered minimum diameter galvanized and clear vinyl coated cable.
    - 3. Provide zinc-plated copper cable fasteners for maximum corrosion resistance.
- 2.2 FASTENING SYSTEM
- A. Deliver the Shade Fabric complete with independent cables pre-inserted in fabric hems.
  - B. Loop and clamp each cable at each end.
  - C. Provide a Fastening System with a factory-installed device at each roof rafter corner.
  - D. The fastening device should feature a concealed mechanism.
  - E. Attach cables to a hook welded to the moving sleeve, thereby distributing tension evenly over rafters and not directly onto the mechanism.

- F. Seal the rafters with no penetrations on the top side, thereby preventing water from entering.
- G. Provide a locking cap at the end of each rafter with a vandal-resistant bolt (special wrench provided by the manufacturer) to prevent unauthorized access to the fastening device mechanism.
- H. Provide a system to adjust the tension on the fabric, which staff controls with the proper tool supplied by the vendor.
- I. Provide instructional video DVD on handling the shade structure, exact procedure for removing, and re-attaching canopy using an actual shade structure in the field.

### 2.3 FABRIC

#### A. Shade Fabric:

- 1. Knitted of monofilament and tape construction high-density polyethylene with Ultra Violet (U.V.) stabilizers and flame retardant, UV-Block Factor varies by standard color offered from 91% to 99%.
- 2. Normal Thickness: 0.057 inches
- 3. Fabric Mass: Min 337 g/m<sup>2</sup>
- 4. Light Fastness: 7-8 (Blue Wool Scale)
- 5. Weather Fastness: 4-5 (Grey Scale Test)
- 6. Tear Resistance: Warp 210N Weft 276N
- 7. Breaking Force: Warp 786N Weft 1544N
- 8. Bursting Pressure: Mean 3125kPa
- 9. Bursting Force: Mean 1775N
- 10. All hems and seams are double rowlock stitched using exterior grade UV-stabilized polyethylene sewing thread.

#### B. Flammability:

- 1. Shade fabric shall pass the requirements established under the NFPA 701 Test Method 2 test standards for flammability, including the accelerated water leaching protocol.
- 2. Furnish written evidence of compliance with this standard, including with accelerated water leaching protocol, with bid proposal.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Installations of shade structure(s) by an installer who shall comply with the manufacturer's instructions for assembly, installation, and erection, per approved drawings.
- B. The site shall be free of construction debris upon the completion of the project.

### 3.2 TRAINING

- A. Provide fabric removal and installation training for school staff members selected by their principal.

END OF SECTION