13310 FABRIC SHADE STRUCTURES FOR PLAYGROUND AREAS

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SPECIFIER:
CSI Master Format 2004 number 13 31 00

This section shall be utilized only when providing a shade structure for "existing to remain" play equipment. When providing new playground equipment, the new equipment shall have an integrated umbrella-type shade structure in accordance with Master Specifications Section 02860.

The shade structure shall utilize a four point system with four columns located a minimum of 10 feet from any part of the playground structure/components. A system utilizing more than four columns requires approval from M-DCPS Facilities Design and Standards on a per project basis. The Drawings shall show the location of the playground equipment, fabric structure columns, fencing, and the extent of fabric along with their dimensional relationship to each other. The shade fabric portion of the system shall be minimized and the shade created by the fabric need only cover the playground equipment.

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PART 1 GENERAL

1.1 SUMMARY

A. The shade structure contractor shall be responsible for the design, engineering, fabrication, and supply of the work specified herein.

1.2 RELATED SECTIONS:

A. Coordinate shade structure work before and after, especially:

1. 02200 - Earthwork
2. 02221 - Excavating
3. 02529 - Concrete Sidewalks
4. 02790 - Poured Rubber Surface for Playground Areas
5. 02795 - Synthetic Grass Surfacing for Play Areas
6. 02830 - Chain Link Fences and Gates
7. 02860 - Primary Play Area Equipment
8. 03300 - Cast-In-Place Concrete
9. 05120 - Structural Steel

1.3 REFERENCES

A. Work shall comply with the latest edition of the following Codes and Standards:

1. Florida Building Code (FBC).
2. Florida Fire Prevention Code (FFPC).
3. ASCE 7 - Minimum Design Loads for Buildings and other Structures.
4. AISC American Institute of Steel Construction.
5. ASTM A500/A500M - Standard Specifications for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

6. ASTM A135/A135M - Standard Specification for Electric Resistance Welded Steel Pipe.
7. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.
8. ASTM E-84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM A-123 – Standard Specifications for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
10. AWS D1.1 Structural Welding Code - Steel.
11. AWS D.I Electrodes, Class E70XX, Low Hydrogen.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. A firm with a minimum of 5 years experience in installing shade structures that can supply a minimum of 10 references of completed projects in South Florida, preferably 5-years or more in age, that are similar in size, design and complexity to this project. Each project listed as reference shall contain the client's name, a person to contact and a phone number.
2. The installer shall supply a letter from the proposed shade structure manufacturer certifying that the installer has a workforce trained in installing its product, that the installer's work is of good quality, and that installer is approved by the manufacturer.

1.5 SUBMITTALS

A. Prior to start of work, provide A/E and M-DCPS the following documents for their review and approval:

1. Qualifications of shade structure manufacturer.
2. Qualifications of shade structure installer as specified herein.
3. Detailed fabrication and erection drawings showing all structural heights, vertical clearances, connections, fabric type and grade, slope of structure, dimensions, and gauge of structural steel.
4. Site plan of play area illustrating playground equipment, fencing, gates, shade structure columns, extent of shade fabric, dimensions, etc.
5. Calculations signed and sealed by a State of Florida Registered Engineer with experience in designing fabric shade structures, demonstrating compliance with Florida Building Code (FBC) - ASCE 7.
6. Text of Special Warranties on letterheads of shade structure assembly installer and shade structure manufacturer.
7. Certification that shade fabric meets or exceeds Class A fire retardant per NFPA 701.
8. Certification that fabric contains lead-free pigment(s).
9. Provide A/E and M-DCPS color palette for fabric and powder-coatings for their selection and approval
10. Once the shade structure design submittals as stated herein have been approved by the A/E and M-DCPS, provide two 12 inch x 12 inch pieces of shade fabric in color selected by A/E and M-DCPS for their approval.

1.6 WARRANTY

A. The Contractor shall provide a non-prorated warranty for the entire shade structure assembly. The warranty shall name the installer of the shade structure as the entity issuing the warranty to the benefit of M-DCPS.

B. Warranty shall include all labor, materials, equipment necessary to repair/replace defective work and/or materials to the satisfaction of M-DCPS. Warranty shall include but not be limited to the following:

1. Replacement of defective fabric and stitching showing signs of rot, embrittlement, cracking, tearing, mold, mildew, shrinkage or significant color change.
2. Repair/replacement of foundation supports and steel structures showing signs of deterioration, excessive rusting, or corrosion.

C. Warranty period for the work shall be as follows:

1. Fabric materials including stitching: 10 years from the date of Substantial Completion.
2. Steel structure: 20 years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 GENERAL

A. Design and manufacture the shade product to the most exacting specifications.

B. The shaded structure system, including but not limited to the footings, structural steel framing, fastening system, fabric, etc., shall be engineered to meet or exceed the requirements of the FBC - ASCE 7.

1. For structures with removable canopy membrane, use Risk Category II, Exposure “C”, with minimum wind speeds per FBC – Section 3105 - Awnings and Canopies.
2. For structures with non-removable canopy membrane, use Risk Category II, Exposure “C”, with minimum wind speed per FBC – Chapter 16 - Structural Design.

C. Packaging: Wrap all metal posts, rafters, and beams to protect the powder coat finish during shipping.

D. Structural Posts, Frame Tubing and Fastening Hardware:

1. Use cold-formed and milled tubing meeting ASTM A135/A135M and ASTM A500/A500M requirements. Minimum yield shall be 40,000 psi with a minimum tensile strength of 45,000 psi on all posts.
2. Weldments: Factory-weld all tubing members using Certified Welders meeting American Welding Society (AWS) specifications. All welded areas shall be prepped and shop coated with a zinc-rich galvanized coating. Minimize use of field welding in the assembly of the shade structure.
3. All steel components shall be hot-dipped galvanized per ASTM A-123 and powder-coated with a minimum 4 mils thickness. Powder-coating shall meet or exceed ASTM standards for Adhesion, Hardness, Impact, Flexibility, Overbake Resistance, and Salt Spray Resistance.

4. All fastening hardware shall be stainless steel.
5. M-DCPS shall select color of powder-coat from manufacturer's palette.

E. Fabric Fastening System:

1. Provide a Fastening System with a factory-installed device at each roof rafter corner.
2. The fastening device should feature a concealed mechanism.
3. Provide zinc-plated copper cable fasteners for maximum corrosion resistance.
4. Attach fabric to frame using a properly sized, vinyl coated galvanized steel tensioning cables a minimum 1/4 inch diameter, with a minimum of two (2) galvanized cable clamps per connection. Cable fasteners shall be zinc-plated copper for maximum corrosion resistance. Provide a system to adjust the tension on the fabric, which staff controls with the proper tool supplied by the vendor
5. Fabric shall be designed to allow for quick removal and reattachment without causing damage to the fabric or fabric components.
6. Attach cables to a hook welded to the moving sleeve, thereby distributing tension evenly over rafters and not directly onto the mechanism.
7. Seal the rafters with no penetrations on the top side, thereby preventing water from entering.
8. 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.
9. 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

F. Shade Fabric:

1. Shade fabric shall be knitted of monofilament and high density polyethylene (HDPE), similar to SupaShade Plus Synthesis or M-DCPS approved equal.
2. Fabric shall be manufactured from 100% high-density monofilament. No tape is permitted.
3. Fabric shall provide minimum 94% UV protection/block and shall meet NFPA 701, 99 Test Method 2 and ASTM E-84 Class A Fire Ratings.
4. All hems and seams shall be double rowlock stitched using exterior grade UV-stabilized polyethylene GORE Tenara sewing thread or approved equal.
5. All fabric panel corners/attachment points and cable exit points shall be reinforced with a double layer of heavy duty 2 inch webbing,
6. Normal Thickness: 0.057 inches
7. Fabric Mass: Min 337 g/m²
8. Light Fastness: 7-8 (Blue Wool Scale)
9. Weather Fastness: 4-5 (Grey Scale Test)
10. Tear Resistance: Warp 210N Weft 276N
11. Breaking Force: Warp 786N Weft 1544N
12. Bursting Pressure: Mean 3125kPa
13. Bursting Force: Mean 1775N

G. Manufacturers:

1. Shade Systems Inc.
2. USA Shade and Fabric Structures
3. Solar Shade USA, LLC

4. Other Manufacturers with product of equal quality and performance as approved by A/E and M-DCPS.

PART 3 EXECUTION

3.1 INSTALATION

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. Upon substantial completion of the work, provide M-DCPS selected personnel, hands-on training on the proper removal and reinstallation of the shade fabric.

END OF SECTION