

Pre-Engineered Fabric Shade Products

Part 1 – General

1.1 Related Documents

Drawings and general provisions of the Contract, including General Conditions and Division 1 Specifications Sections, apply to this section.

1.2 Summary

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

1.3 Submittals

1.3.1 Pre-Bid Submittals

- A. Provide proof of installed reference sites with structures for similar scope of project and installation that are engineered to International Building Code (IBC) specifications. Include in reference list of structure dimensions with install dates and project locations.
- B. Provide information to establish desired fabric color and powder coat color.
- C. Provide proof of all quality assurance items including:
 - 1. A list of at least six (6) public municipal installations where manufacturer's product as proposed pursuant to this bid has been installed and has been in continuous use for a minimum of five (5) years each.
 - 2. All manufacturers shall provide proof of a minimum \$ 2,000,000.00 (AG) General Public Liability Insurance, \$ 2,000,000.00 Professional Liability (PL) insurance, \$ 100,000.00 Inland Marine Insurance, and additional \$ 5,000,000.00 Umbrella Liability insurance.

1.3.2 Award of Contract Submittals

- A. Make available wet-sealed structural engineering drawings and calculations
- B. Provide fabric color and powder coat color selections for final order.

1.4 Project Conditions

- A. Field Measurements: verify layout information for shade structures shown on the drawings in relation to the property survey and existing structures. Verify locations by field measurements prior to construction.

1.5 Warranty

- A. The successful bidder shall provide a one (1) year warranty on all labor and materials.
- B. A supplemental non-prorated warranty from the manufacturer shall be provided for a period of ten (10) years on fabric including stitching and twenty (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 the Owner may have under the provisions of the Contract Documents, and will be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contractor documents.
- D. Because of surety requirements, any performance and payment bond that might be required will cover only the first year of the warranty. The manufacturer's warranty will be a separate document and will be executed at the time of completion of the work.

Part 2 – Products

2.1 General

The shade products shall be designed and manufactured to the most exacting specifications by skilled craftsmen, and certified by Professional Engineers for structural soundness of designs. All shade products are shipped knocked-down, with complete assembly instructions, and ready for easy in-field installation.

Bidder's products must be completely manufactured entirely in its own factory by its own employees, including powder-coating, thereby ensuring complete quality control. Bidder must certify that no aspect of its production – including powder-coating – is contracted out to third parties.

The proposed structure(s) manufactured by Shade Systems, Inc.TM or approved equal, shall be modular and pre-fabricated, and include the structural steel frame, fabric roof, steel cables and all fasteners.

Manufactured by: Shade Systems, Inc.
4150 SW 19th Street
Ocala, FL 34474
(800) 609-6066 Tel
(352) 237-2256 Fax
Contact: Jeremy Purkis
Email: Jeremy@shadesystemsinc.com
www.shadesystemsinc.com

- B. Or Equal: Standard for approved equal. Ten (10) day prior approval required for substitution of product design, materials and features specified above. Submittals must include plans, drawings, cut sheets, material data sheets, testing results and samples. Bids failing to meet this requirement will be deemed non-responsive.
- C. Structures are engineered to meet or exceed the requirements of International Building Code (IBC), and the following standard specifications:
- Wind Speed (Frame only): 165 M.P.H.
- Wind Speed (Frame w/canopy): 90 M.P.H.
- Live Load: None
- Snow Load: None
- Optional designs with greater wind speeds, live loads, and snow loads are available.*
- D. Material: All materials shall be structurally sound and appropriate for safe use. Product durability shall be ensured 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. Fabrics used shall include UV-stabilizers and fire retardants for longevity and safety.
- E. Packaging: All metal posts, rafters and beams shall be wrapped in plastic and cardboard to protect the powder coat finish during shipping.
- F. Weldments: All tubing members are factory-welded by Certified Welders to American Welding Society (AWS) specifications and to the highest standards of quality workmanship. Weldments are finished with a zinc-rich galvanized coating. No field welding is required in the assembly of the shade products.
- G. Posts, Structural Frame Tubing, and Hardware: All tubing used shall be cold-formed and milled per ASTM A-135 and ASTM A-500. Material testing is in accordance with ASTM E-8. Minimum yield is 40,000 psi with a minimum tensile strength of 45,000 psi on all posts. All tubing shall be pre-cut to appropriate lengths, and all outside surfaces shall be galvanized, with an interior corrosion-resistant zinc-rich coating. Where required, support pipes shall be schedule 40 hot-dip galvanized or powder-coated black steel. All fastening hardware shall be stainless steel.

- H. **Architectural Powder-coating Process:** All powder-coated parts undergo a rigorous multi-step process to ensure colorfastness and durability per the specific sequential steps itemized below. All parts are completely sandblasted, pre-treated, and coated with coastal primer prior to powder coating. Powder-coating is then electrostatically applied and oven-cured at 375 to 425 degrees Fahrenheit. Powders shall meet or exceed ASTM standards for Adhesion, Hardness, Impact, Flexibility, Overbake Resistance, and Salt Spray Resistance. Colors shall be specified.

The following seven (7) specific steps shall occur in sequence:

1. **Sandblasting.** All powder-coated parts shall be completely sandblasted with the use of 80 grit garnet abrasives.
2. **Mechanical smoothing.** A traditional mechanical method shall be used for removing remaining foreign matter for surface preparation by use of sanding, grinding, and rounding rough edges to smoothness.
3. **Initial Surface Preparation.** A heavy-duty liquid cleaner such as *Calvary Industries Inc Cal Clean 675* shall be applied for initial surface preparation.
4. **Corrosion resistant Coating.** A liquid detergent iron phosphate, such as *Calvary Industries Inc, Cal Prep 63*, shall be applied, thereby resulting in a superior quality corrosion resistant coating.
5. **Final Surface Preparation.** All parts shall then be sealed using a reactive, non-chrome sealer product such as *Calvary Industries, Advantech S1488E Sealer*. The sealer enhances corrosion protection and increases paint adhesion, effectively increasing salt spray hours on all metal substrates.
6. **Coastal Primer.** Prior to powder-coating, a rust inhibiting coastal primer shall be applied on all parts, such as *PPG Envirocron™*. The coastal primer coating provides a combination of good physical and chemical resistance properties, and is the ideal solution for smooth, low-bake durability and physical property requirements for the most demanding environments.

Primer attributes:

Gloss (ASTM D-523):	0-10 @ 60°
Adhesion (ASTM D-3359):	100% (5B Pass)
Hardness (ASTM D-3363):	2H Pencil (Eagle)
Impact Resistance (ASTM D-2794):	80 In.-lbs. Direct
Conical Mandrel (ASTM D-522):	1/8" - No Cracking
Salt Spray (ASTM B-117):	4000 Hours Pass
	1000 Hours (degrease only)
Humidity (ASTM D-1735):	100F, 100% RH-2000+ Hours
Scab Corrosion (SAE-J2334):	120 Cycles - Pass
Film Properties (Thickness):	2 mils

7. **Application of Powder-Coating.** Lastly, PPG Envirocron™ Ultradurable powder coatings shall be used to provide a combination of excellent physical and chemical resistance properties, outstanding resistance to outdoor weathering, and a durable and uniform final coat.

Powder Coat Characteristics:

Gloss (ASTM D-523):	80 Minimum @ 20°
Gloss (ASTM D-523):	80 Minimum @ 60°
Adhesion (ASTM D-3359):	100% (5B Pass)
Hardness (ASTM D-3363):	2H Pencil (Eagle)
Impact Resistance (ASTM D-2794):	40 In.-lbs. Direct
	20 In.-lbs. Reverse
Conical Mandrel (ASTM D-522):	1/8" Mandrel - No Cracking
Salt Spray (ASTM B-117):	1000 Hours Pass
	< 1/8" Scribe Creep
	No Blisters
Humidity (ASTM D-1735):	1000 Hours Pass
	< 1/16" Scribe Creep
	No Blisters
Film Properties (Thickness):	3 mils

- I. Standard Footings: Footings shall be designed per stringent International Building Code (IBC) for the specified structure. Columns will be provided as standard direct embedment. Other footing designs are available.
- J. Roofing: Structural frames and/or fabric sails are designed by Shade Systems only for use with CoolNet™ polyethylene shade fabric. Fabric is attached to frame or columns using stainless steel and clear vinyl coated cable. Cable fasteners are zinc-plated copper for maximum corrosion resistance.

2.2 Fastening System (**Frame Structure**)

- A. Coolnet™ Shade Fabric shall be delivered complete with independent cables pre-inserted in fabric hems. Each cable shall be looped and clamped at each end. Fastening System to consist of the Turn-N-Slide™ fastening device which is factory installed at each roof rafter corner. The Turn-N-Slide features a concealed mechanism which allows the attachment hook and sleeve at each rafter corner to move along a track in the rafter. Cables are attached to hook which is welded to the moving sleeve, thereby distributing tension evenly over rafters and not directly onto the mechanism. Rafters are sealed with no penetrations on the top side, thereby preventing water from entering. Such moving sleeve with hook allows the looped ends of each cable to slide over the hook when the sleeve is at its upper position, and

then by turning the concealed fastener within the rafter, moves the sleeve with hook outward (toward end of rafter), thereby tensioning the cables and securing the fabric at the proper tautness. A locking cap is secured at the end of each rafter with a vandal-resistant bolt (special wrench provided by the manufacturer) to prevent unauthorized access to the Turn-N-Slide mechanism. To remove the canopy, the cap is removed, and the mechanism rotated counter-clockwise. The sleeve with hook moves inward (toward peak of roof), thereby de-tensioning the cables, and allows fast removal of the canopy. Continuous one-piece cables, cables which are not independent per side and pre-looped and clamped at the factory, and/or cables which must be tensioned with the use of turnbuckles or tools not provided by the manufacturer are not acceptable. Structures which do not feature the Fastening Mechanism on each and every rafter, or fastening mechanisms which do not feature a sealed top rafter and moving outer sleeve such as the Turn-N-Slide, are not acceptable.

- B. Fastening System Instructional Video: Product must be delivered complete with a minimum 5-minute instructional video on an USB Flash Drive. Video must show the viewer the exact procedure for removing and re-attaching canopy using an actual shade structure in the field. Submittals which do not include the video on an USB Flash Drive are not acceptable.

2.3 Fastening System (**Sail Structure**)

- A. CoolNet™ Shade Fabric shall be delivered complete with fastening system installed. Fastening System to consist of factory-formed stainless steel tensioning plates pre-attached to fabric canopies at each corner, and cables per the above hemmed into the fabric at the factory and terminating in the bracket. Posts shall be equipped with an adjustable 360-degree swivel and pivot attachment mechanism to which the tensioning plate fastens. Tensioning plate includes a stainless steel adjustment bolt which, when turned, tensions the fabric for a taut fit. Fabrics, cables, and brackets which are not pre-assembled at the factory are not acceptable. Cables which attach to posts with u-bolts or 'S' hooks, and which do not use a stainless steel bracketing system similar to the above are not acceptable.

2.3 Fabric

- A. Shade Fabric: Knitted of monofilament and tape construction high density polyethylene with Ultra-Violet (U.V.) stabilizers and flame retardant. CoolNet™ offers the ultimate combination of maximum sun protection, strength and durability to ensure maintenance free long-life performance. UV- Block Factor varies by standard color offered from 90% to 97%.

Coolnet™ Properties:

Nominal Fabric Mass:		Min. 340 g/m ² // 10 oz/yd ²
Fabric Thickness:	ASTM D5199-12	.06 inch
Temperature Range:		-50°F to 248°F
Roll Width:		9 ft. 10 in.
Roll Length:		131 ft.
Tensile Strength:	ASTM D5034-09	Warp (189.1 lbf) / Weft (462.3 lbf)
Elongation:	ASTM D5034-09	Warp (88.7%) / Weft (49%)
Tongue Tear:	ASTM D2261-13	Warp (39.6 lbf) / Weft (43 lbf)
Burst Strength:	ASTM D6797-15	408.0 lbf
Flammability:	ASTM E-84 Class A	
Lead:		PASS
Phthalate:		PASS

CoolNet™ Shade Fabrics meet the most stringent Fire Standards for shade fabrics including CSFM 1237.1 and NFPA 701 across all color variants.



All hems and seams are double row lock stitched using exterior grade UV- stabilized polyethylene GORE™ TENARA™ sewing thread (GORE and TENARA are trademarks of W.L. Gore & Associates).

Color	Weight (oz/yd²)	Shade Factor %	UVR Block %
Canary Yellow	10	78	93
Oyster Grey	10	80	92
Eggshell White	10	78	94
Lime Green	10	88	91
Fire Orange	10	81	92
Blizzard Blue	10	87	93
Grape Purple	10	88	91
Desert Sand	10	86	93
Rivergum Green	10	90	94
Bright Red	10	80	90
Mocha Brown	10	94	96
Charcoal Grey	10	94	94
Bora Bora Blue	10	90	93
Lagoon Blue	10	90	94
Stormy Grey	10	95	97
Barley Brown	10	89	94
Brick Red	10	91	92
Silver Grey	10	90	92
Light Blue	10	91	94
Navy Blue	10	93	94
Aquatic Blue	10	88	92
Forest Green	10	93	94

Part 3 – Execution

3.1 Installation

Installations of shade structure(s) shall be performed by an installer who shall comply with the manufacturer's instructions for assembly, installation, and erection, per approved drawings.

A. Concrete

- Concrete work shall be executed in accordance with the latest edition of the American Concrete Building Code, ACI 318.
- All reinforcement shall confirm to ASTM A-615, Grade 60.
- Reinforcing steel shall be detailed, fabricated, and placed in accordance with the latest ACI Detailing Manual, and Manual of Standard Practice.