

SHADE STRUCTURE MATERIAL SPECIFICATIONS

Rev. 10/8/2012

1.01 FABRIC SPECIFICATIONS

- A. UV shade fabric is made of UV stabilized cloth manufactured by ALNET, or approved equal.
- B. The high density polyethylene material shall be manufactured with tensioned fabric structures in mind.
- C. The fabric knit is to be made using monofilament and tape filler which has a weight of 9.38 to 10.32 oz. sq. yd. Material to be Rachel-knitted to ensure material will not unravel if cut.
- D. Burst strength of 828 lbf (ASTM 3786).
- E. Cloth meets fire resistance tests as follows:
 - Alnet Extra Block: California State Fire Marshall Reg. #F-93501
 - Others: NFPA 701-99 (Test Method 2)
 - ASTM E-84
- F. Fabric Properties:

| STRETCH | STENTORED |
|-----------------------------|--|
| Tear Tests (lbs/ft) | WARP 44.8 WEFT 44 |
| Burst Tests (lbs ft) | 828 |
| Fabric Weight (oz/sqFT) avg | 1.02 to 1.07 |
| Fabric Width | 9'-10" |
| Roll Length | 150' |
| Roll Size | 63" x 16.5" |
| Weight | 120 lbs. |
| Life Expectancy | 10 years |
| Fading Note | Minimum fading after 6 years. 3 years for Red and Yellow. |
| Temperature | - 77 degrees |
| Maximum Temperature | +167 degrees |

1.02 THREAD

- A. Shall be 100% expanded PTFE fiber which carries a 10 year warranty that is high strength and low shrinkage.
- B. Shall have a wide temperature and humidity range.
- C. Abrasion resistant and UV radiation immunity.
- D. Shall be unaffected by non-hydrocarbon based cleaning agents, acid rain, mildew, rot, chlorine, saltwater, and pollution.
- E. Lockstitch thread – 1200 Denier or equal.
- F. Chain stitch thread – 2400 Denier or equal.

1.03 STEEL TUBING

- A. All fabricated steel must be in accordance with approved shop drawings and calculations.
- B. All steel is cleaned, degreased or etched to ensure proper adhesion of powder-coat in accordance with manufacturer's specifications.
- C. All Steel used on this project needs to be new and accompanied by the mill certificates if requested. Structural steel tubing up to 5"-7" Gage shall be galvanized per Allied Steel FLO-COAT specifications. Schedule 40 black pipe fabrications shall be sandblasted and primed as described below.
- D. All non-hollow structural shapes comply with ASTM A-36, unless otherwise noted.
- E. All hollow structural steel shapes shall be cold formed HSS ASTM A-53 grade C, unless otherwise noted.
- F. Plate products shall comply with ASTM A-36.

1.04 POWDER COATING & PRIMING

- A. All non-galvanized steel shall be sandblasted and primed prior to powder coating using brown fused aluminum oxide grit and the following primer.
- B. All non-galvanized steel must be coated with rust inhibiting primer prior to applying the powder coat. Primer shall be Marine Grade Cardinal Industrial Finishes Corp. E396 – GR1372 epoxy powder coating semi-gloss smooth zinc rich primer.

- C. Welds shall be primed with rust inhibiting primer prior to applying the powder coat. Primer shall be Marine Grade Cardinal Industrial Finishes Corp E396-GR1372 epoxy powder coating semi-gloss smooth zinc rich primer.
- D. All steel parts shall be coated for rust protection and finished with a minimum 3.5 mil thick UV-inhibited weather resistant powder coating.
- E. Characteristics: Powder used in the powder-coat process shall have the following characteristics:

| | | |
|-------|-----------------------------|----------------------|
| N.3.1 | Specific gravity | 1.68+/-0.05 |
| N.3.2 | Theoretical coverage | 114+/- 4 ft 2/lb/mil |
| N.3.3 | Mass loss during cure | < 1% |
| N.3.4 | Maximum storage temperature | 75 degrees F |

- F. Powder-coating shall meet the following tests:

| | | |
|----------------|---|-----------------------|
| ASTM | Gloss at 60 degree | 85-95 |
| HOI TM 10.219 | PCI Powder smoothness | 7 |
| ASTM D2454-91 | Over-bake resistance time | 200% |
| ASTM D3363-92A | Pencil hardness | H-2H |
| ASTM D2794-93 | Dir/Rev Impact, Gardner | 140/140 in/lbs |
| ASTM D3359-95B | Adhesion, cross hatch | 5B Pass |
| ASTM D522-93A | Flexibility Mandrel | 1/4" dia. No fracture |
| ASTM B117-95 | Salt Spray | 1,000 hours |
| UL DtOV2 | Organic coating steel enclosures, elect eq. | Recognized |

- G. Application Criteria:

| | | |
|-------|--------------------------|-----------------------------|
| N.5.1 | Electrostatic spray cold | Substrate:0.032 in. CRS |
| N.5.2 | Cure Schedule | 10 minutes at 400 degrees F |
| N.5.3 | Pretreatment | Bonderite 1000 |
| N.5.4 | Film Thickness | 3.5 Mils |

1.05 WELDING

- A. All shop welds shall be executed in accordance with the latest edition of the American Welding Society Specifications.
- B. Welding procedures shall comply in accordance with the AWS D1.1-AWS Structural Welding Code-Steel.

- C. All welds to be performed by a certified welder. All welds shall be continuous where length is not given, unless otherwise shown or noted on drawings.
- D. All welds shall develop the full strength of the weaker member. All welds shall be made using E70xx.035 wire.
- E. Shop connections shall be welded unless noted otherwise. Field connections shall be indicated on the drawings. Field –welded connections are not acceptable.
- F. All fillet welds shall be a minimum of ¼” unless otherwise noted.
- G. All steel shall be welded shut at terminations to prevent internal leakage.
- H. Internal weld sleeving is not acceptable.
- I. On-site welding of any component is not acceptable.

1.06 SEWING

- A. On-site sewing of a fabric will not be accepted.
- B. All corners shall be reinforced with extra non-tear cloth and strap to distribute the load.
- C. The perimeters that contain the cables shall be double lock stitched.

1.07 INSTALLATION HARDWARE

- A. Bolt and fastening hardware shall be determined based on calculated engineering loads.
- B. All bolts shall comply with SAE-J429 (Grade 8) or ASTM A325 (Grade BD). All nuts shall comply with ASTM F-594, alloy Group 1 or 2.
- C. Upon request, Stainless Steel hardware shall comply with ASTM A-304.
- D. 1/4” galvanized wire rope shall be 7x19 strand with a breaking strength of 7,000 lbs. for shades generally under 575 sq. ft. unless requested larger by the customer. For shades over 575 sq. ft., cable shall be 5/16” with a breaking strength of 9,800 lbs. Upon request, 1/4” Stainless Steel wire rope shall be 7x19 strand with a breaking strength of 6,400 lbs. 5/16” Stainless Steel wire rope shall be 7/19 strand with a breaking strength of 9,000 lbs.
- E. All fittings required for proper securing of the cable are hot dipped galvanized.

1.08 CONCRETE

- A. Concrete work shall be executed in accordance with the latest edition of American Concrete Building Code ACI 318 unless specified by the governing municipality.
- B. Concrete specifications shall comply in accordance with, and detailed as per plans as follows:
 - 1. 28 Days Strength $F'_c = 2500$ psi
 - 2. Aggregate: HR
 - 3. Slump: 3-5
 - 4. Portland Cement shall conform to C-150
 - 5. Aggregate shall conform to ASTM C-33
- C. All reinforcement shall conform to ASTM A-615 grade 60.
- D. Reinforcing steel shall be detailed, fabricated and placed in accordance with the latest ACI Detailing Manual and manual of Standard Practice
- E. Whenever daily ambient temperatures are below 80 degrees Fahrenheit, the contractor may have mix accelerators and hot water added at the batch plant (See Table 1).
- F. The contractor shall not pour any concrete when daily ambient temperature is below 55 degrees Fahrenheit.

| Temperature Range | % Accelerator | Type Accelerator |
|-------------------|---------------|--------------------------|
| 75-80 degrees | 1% | High Early (non calcium) |
| 70-75 degrees | 2% | High Early (non calcium) |
| Below 70 degrees | 3% | High Early (non calcium) |

1.09 FOOTINGS

- A. All anchor bolts set in new concrete shall be ASTM A-307, or ASTM F-1554 if specified by engineer.
- B. All anchor bolts shall be zinc plated unless specified otherwise.
- C. Footing shall be placed in accordance with and conform to engineered specifications and drawings.