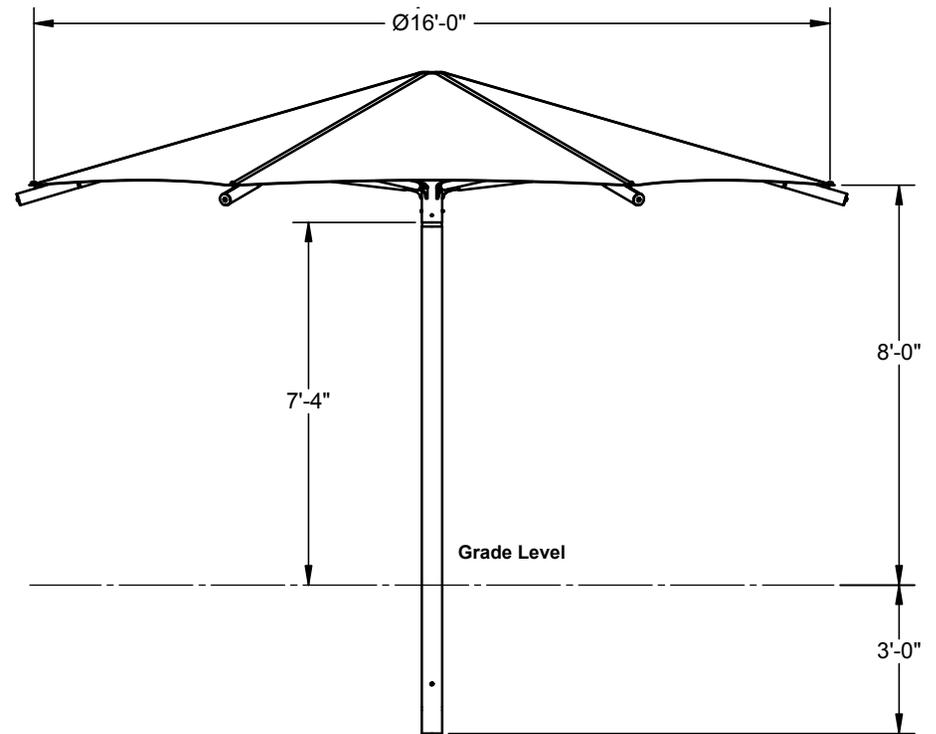
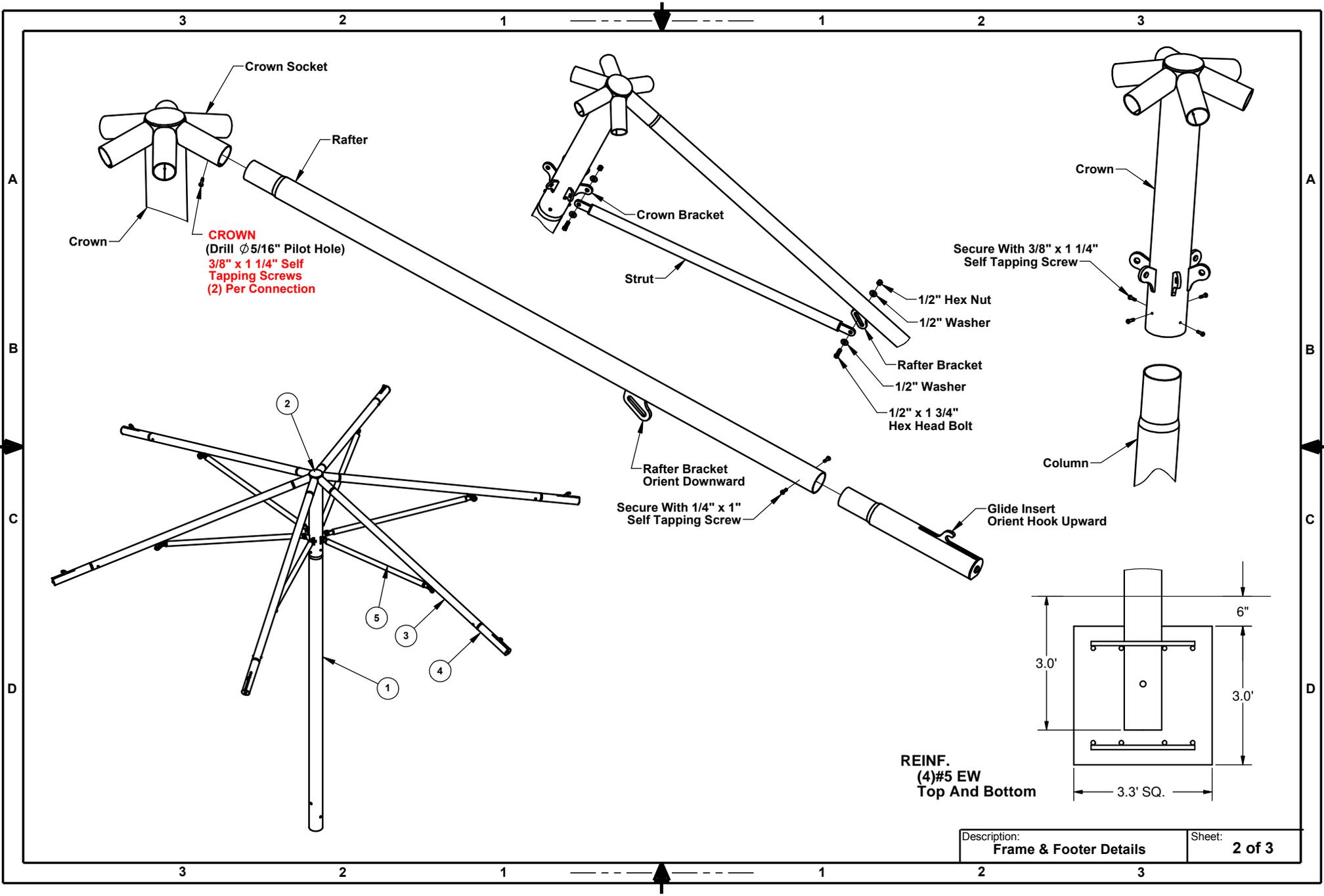




REF.#	PART DESCRIPTION	QTY.
1	Column - EMB Ø5" Swaged Umbrella	1
2	Crown - Ø5" With Six 2 7/8" Sockets	1
3	Rafter - Ø2 7/8" With Slotted Bracket	6
4	Glide - Ø2 7/8" Mechanized Insert	6
5	Strut - Ø1.9" Rigid	6
6	Fabric - Ø16' With Cable Insert	1
7	Frame Hardware Kit	1



Description: Embedded Ø16' x 8' Hexagonal Umbrella		
Scale: Varies	Shade Style: Mech.	Sheet: 1 of 3
Date:	Units: Inches / Feet	Proposal No:



REINF.
(4)#5 EW
Top And Bottom

Description: Frame & Footer Details	Sheet: 2 of 3
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3 2 1 1 2 3

A

A

B

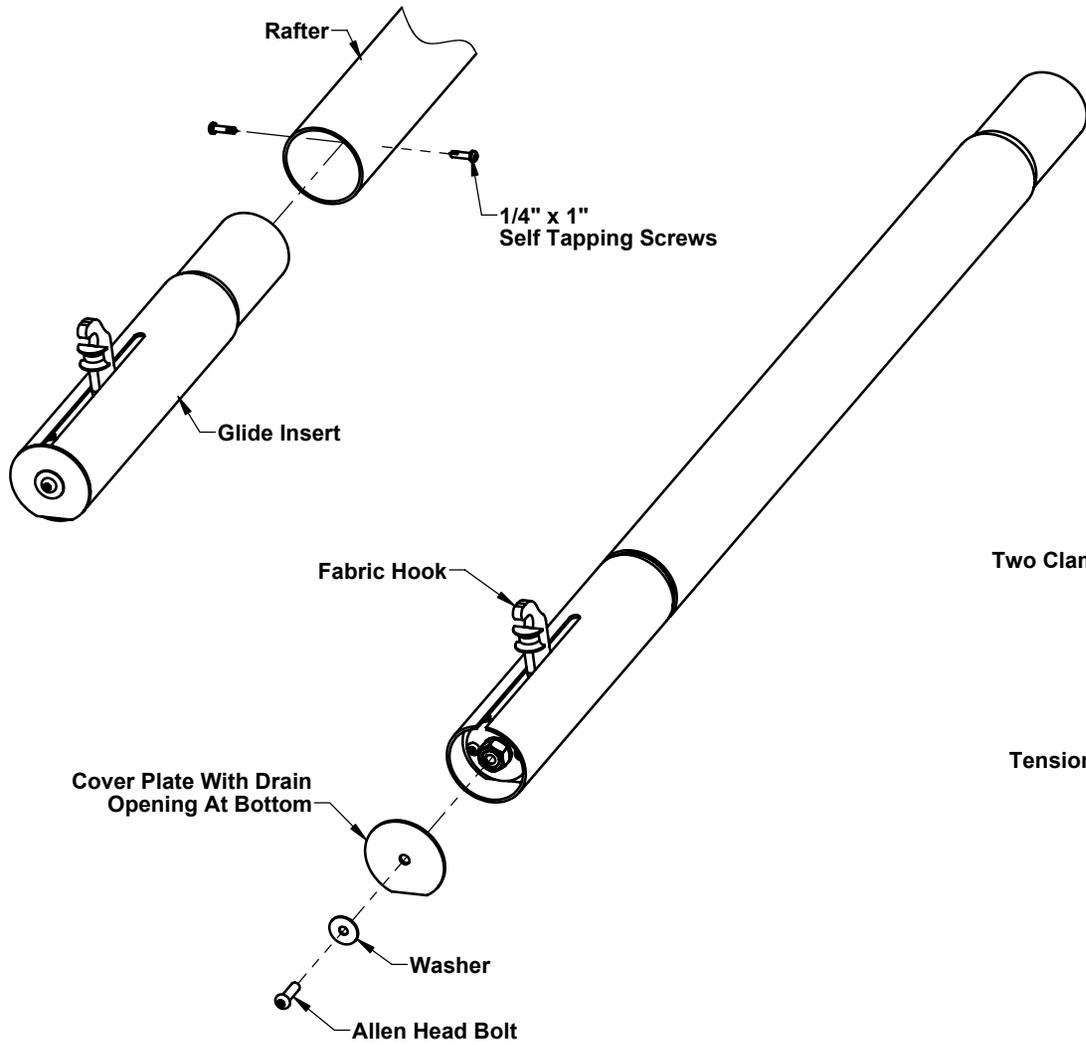
B

C

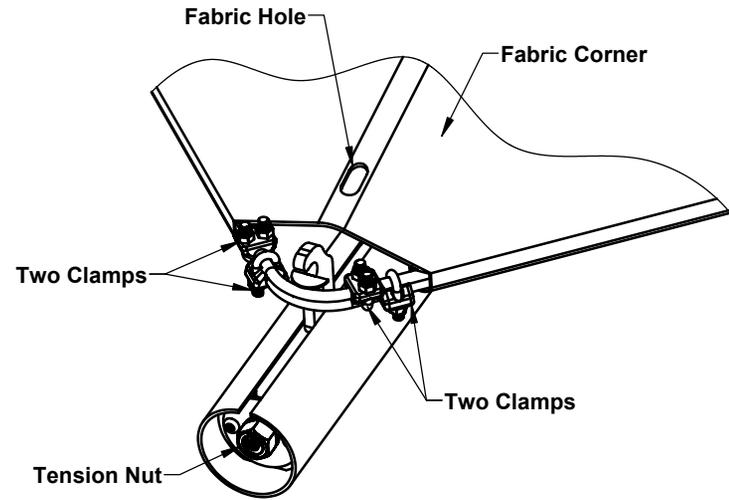
C

D

D

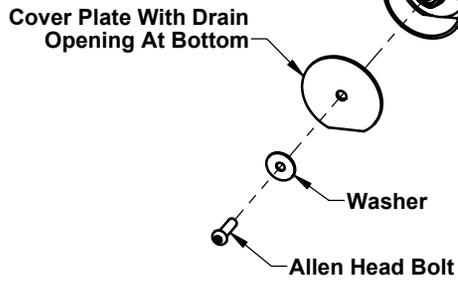


Smaller framed umbrella's will not have a cable guide on the glide hook. The cable followed by the fabric hole are both placed over the hook.



NOTE: On three of the four corners the cable will loop around the hook or cable guide.

On the fourth corner the cable ends will overlap around the hook or cable guide and be secured with two cable clamps on either side. The fabric hole is then pulled over hook. Loose cable end are to be tucked back into fabric hems.



3 2 1 1 2 3



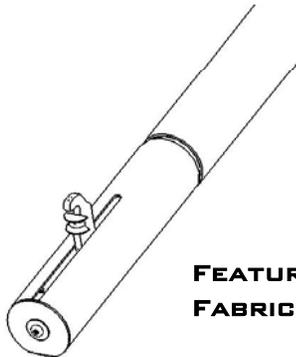
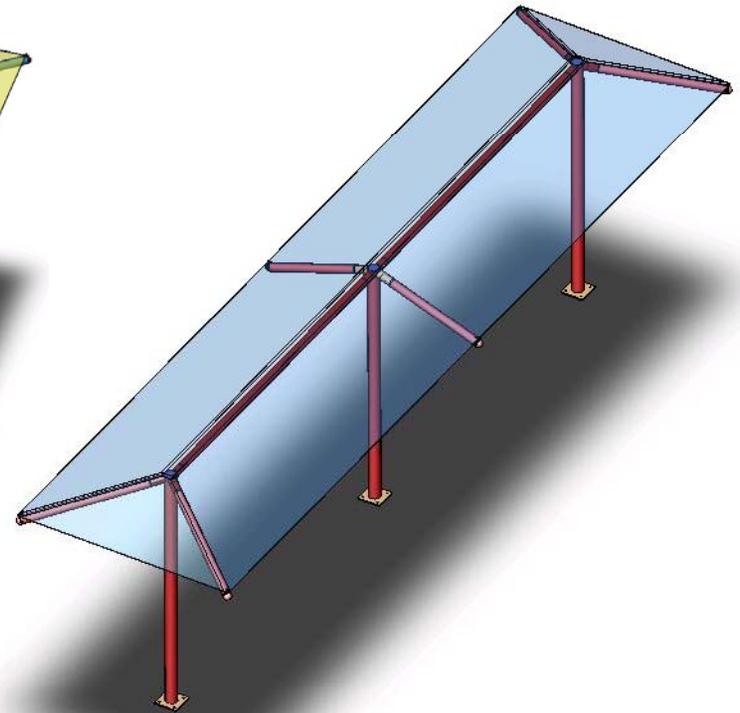
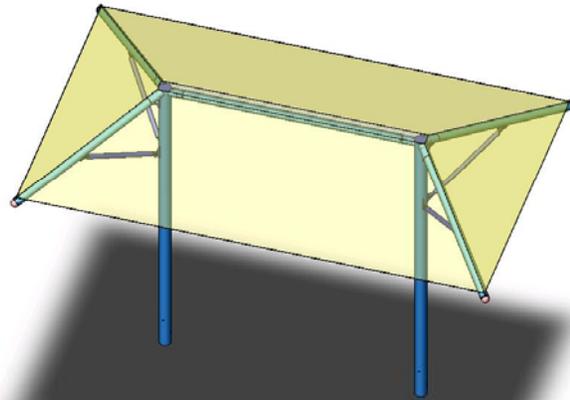
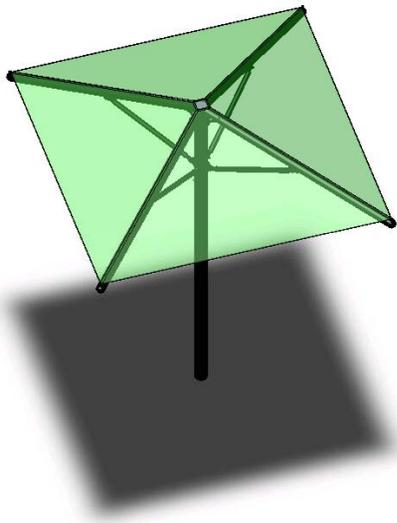
WARNING:

Cables must exit through holes under webbing to ensure spacing for the FOUR cable clamps.

UMBRELLA SHADE DESIGN INSTALLATION

SINGLE, DUAL AND TRIPLE COLUMN MODELS

EMBEDDED AND SURFACE MOUNT



FEATURING THE GLIDE INSERT
FABRIC TENSIONING SYSTEM.

INSTALLATION INTRODUCTION

It is very important that you read this entire manual before beginning the installation process. We are continuously striving to improve our product, and the *Installation Introduction* will Contain the latest up-to-date information.

STORAGE:

When Shade Unit equipment is received at the job site it should be installed as soon as possible (within a few days). We package the equipment components to keep them safe and damage-free during shipment. However, the packaging material is not suited for periods of extended storage in an uncontrolled environments. The combination of moisture in the air mixed with heat generated inside the plastic shrink-wrap may cause damage to the finish of powdercoated frame members.

If an immediate installation is not possible, certain steps should be taken to minimize the risk of damage to the components. If Shade components must be stored, ideally they should be kept in a controlled warehouse or storage container environment away from heat and moisture. If this is not possible, the packaging material should be removed. Care is recommended when using guttering blades to remove packaging. Keep blades away from powdercoated surfaces to avoid damage to finish..

INVENTORY:

It is very important that you inventory all Shade equipment received using the Packing List that shipped with your unit. Review all items for proper quantities and check for any damaged components. Notify us immediately if any components are missing or damaged at (800) 856-4727.

We are not responsible for items discovered missing after 72-Hours from time of delivery.

IF YOU NEED TO REPLACE DAMAGED PARTS OR HAVE INSTALLATION
QUESTIONS, PLEASE CALL OUR CUSTOMER SERVICE REPRESENTATIVES AT

866-511-5642

SHADE UNIT SITE PREPARATION

Using the provided plan view drawing of your unit, locate the position of all four support columns.

All loose asphalt, concrete and debris must be removed from the entire site prior to installation.

Site must be graded as close to level as possible to aid in unit construction. Special installation considerations must be implemented for sites that are not level.

The customer is responsible for checking local soil and drainage conditions within the site area. Proper drainage around the unit and the support columns is important. Inquire with local contractors in your area for drainage recommendations.

Site must be surveyed for underground hazards such as Electrical Cables, Phone Lines and Gas or Water Pipes. Serious injury or death could result if these hazards are not first located and marked within the site.

Never leave the job site unattended without making sure that all open holes are covered with material such as plywood. Rope off all unfinished construction to keep children away from site until job is complete.

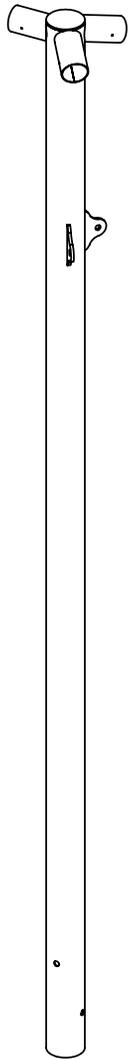


REQUIRED TOOLS

- (A) Safety Glasses
- (B) String Level, Magnetic Level
- (C) Rubber Mallet
- (D) Shovel / Post Hole Digger / Auger
- (E) Tape measure
- (F) Rechargeable Drill / Drill Bit Set
- (G) Socket Set (SAE)
- (H) Adjustable Wrench
- (I) Center Punch
- (J) Two Ladders (10' recommended)
- (K) Duct Tape
- (L) One 2" x 8" x 16" Wood Length
- (M) Multiple Scrap 2" x 4" x 8' Lengths
- (N) 1/2" x 4' x 4' Plywood Sheet
- (O) Wheelbarrow / Loader

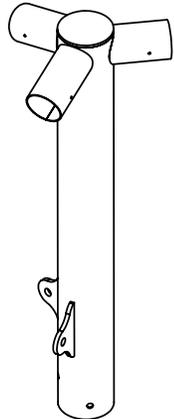


UMBRELLA SHADE COMPONENT INVENTORY

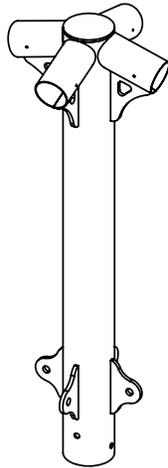


SINGLE COLUMN

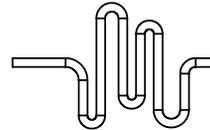
TWO & THREE COLUMN CROWN



SINGLE COLUMN CROWN



DRIVER TOOL



CABLE LENGTH
Cable Will Be Installed Within Fabric If Shade Has Glide Equiped Rafter



ANCHOR ROD WASHERS



HEX HEAD BOLTS



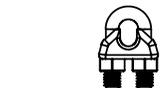
NYLOCK HEX NUTS



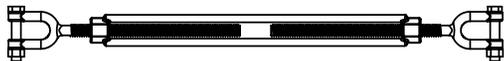
WASHERS



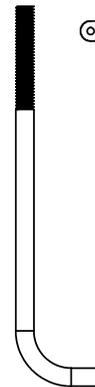
SELF TAPPING SCREWS



CABLE CLAMPS
Supplied With Umbrellas Using Turnbuckle



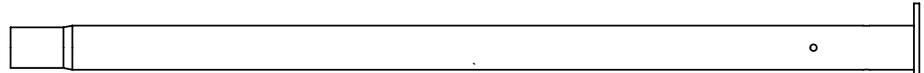
TURNBUCKLE
Turnbuckle Is Supplied When Unit Has Standard Rafter



ANCHOR RODS
Supplied With 12" x 12" Or Larger Base Plate Columns.



EMBEDDED COLUMN



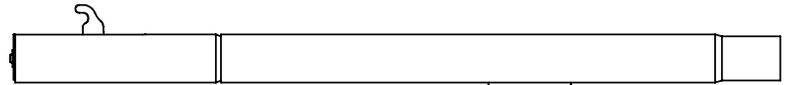
SURFACE MOUNT COLUMN



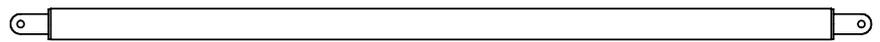
RIDGE POLE
Two & Three Column Umbrellas



STANDARD RAFTER WITH CAPPED END & HOOK



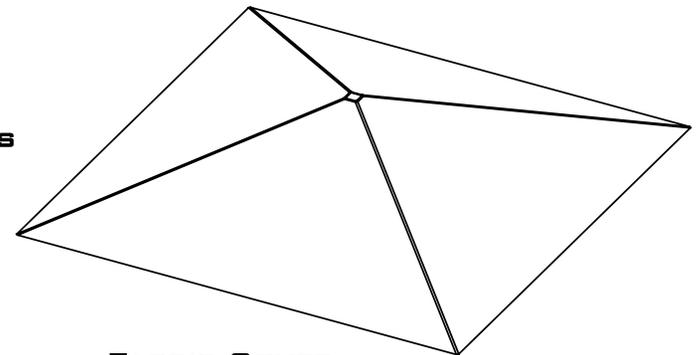
RAFTER WITH GLIDE INSERT



RIGID STRUT



ANCHOR ROD NUTS



FABRIC COVER

STEP #1:

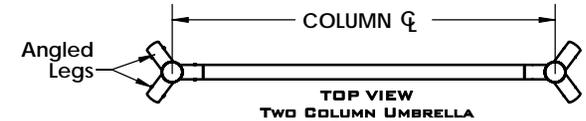
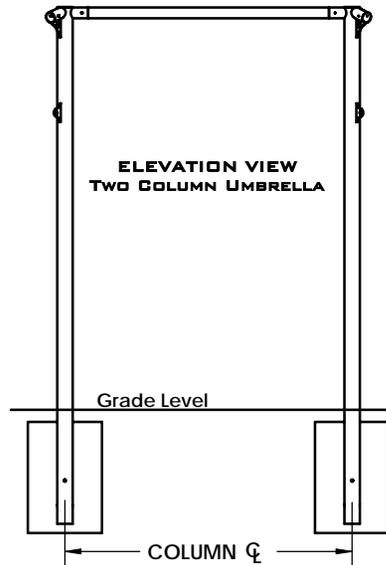
For two and three column Umbrellas locate and mark the positions of the upright columns. Refer to the specific dimension information for your Shade unit provided in this packet.

EMBEDDED COLUMNS:

- Excavate footings in accordance with the dimensions specified for your Shade unit. Refer to the specific dimensions provided for your unit within in this packet.
- Place a 3" block in the bottom of each hole.
- Place a column into each hole on top of each block.
- Block and brace each column into position making sure that they are plumb and remain on centers. The distance between the columns at the top between centers must be correct.
- Pour concrete around columns until it is three inches below grade level. ***Allow concrete to harden for 48-hours before proceeding to next step.***

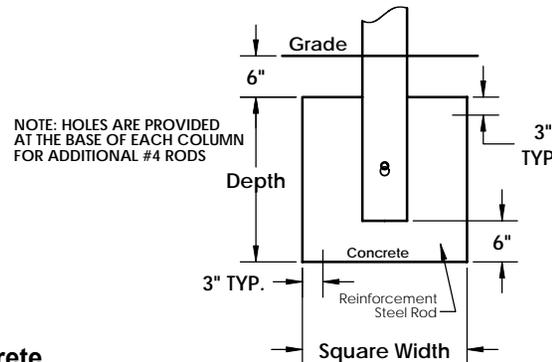
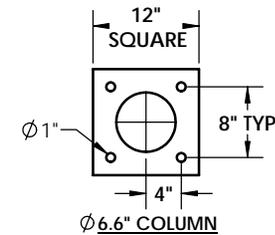
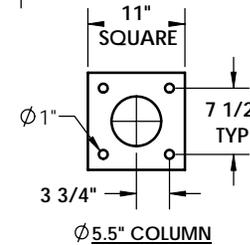
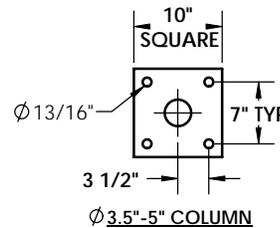
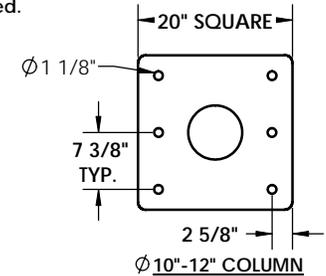
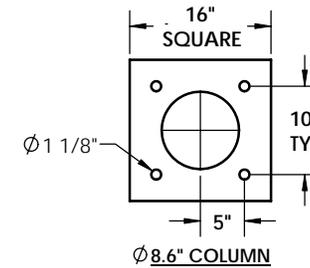
BASE PLATE COLUMNS:

- Excavate footings for concrete pads in accordance with the dimensions specified for your shade structure. Refer to the specific dimensions provided in this packet.
- Cut the plywood sheet into four squares 2" larger than your base plates. Working from the center, mark off the hole pattern that applies to your base plate. Mark the center point of the column as well.
- Drill four holes through the plywood at the outer marks.
- Insert the four anchors through the holes. Thread a nut completely over each anchor on top of the plywood. The four anchors should hang from the plywood.
- Fill the footer holes with concrete to 4" below grade.
- Place one Plywood sheet with anchors over each footer submersing the anchors into the concrete. Make sure the the center marks are on your column centers.
- After the concrete has started to harden you must remove the hardware and plywood from each footer.
- Let concrete harden for 48-hours.
- Re-thread a nut over each anchor down to the concrete. Place a washer over each anchor followed by each column base plate. Adjust the nuts under the base plates to plumb each column. Insert a washer and thread a nut over each anchor tight against base plate.
- Apply concrete Grout base between base plates and concrete.

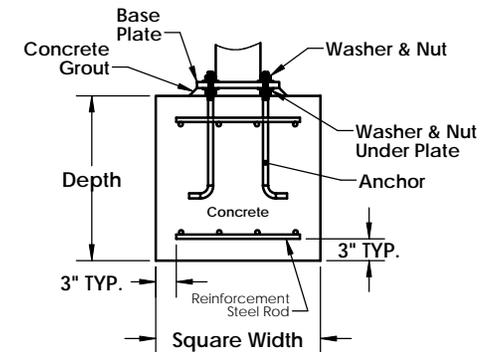


IMPORTANT NOTE:

Some $\phi 5"$ And Larger Columns Are One Part And Do Not Have A separate Crown. Ridge Pole Must Be Positioned Between Columns Before Concrete Is Poured.



NOTE: HOLES ARE PROVIDED AT THE BASE OF EACH COLUMN FOR ADDITIONAL #4 RODS



3

2

1

1

2

3

A

B

C

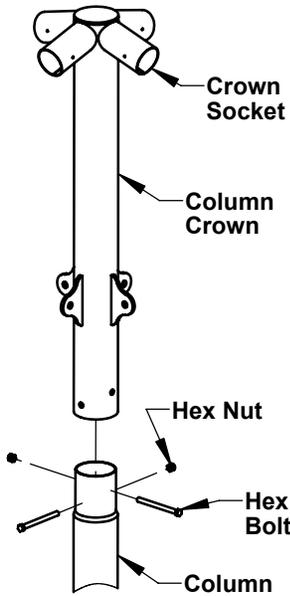
D

A

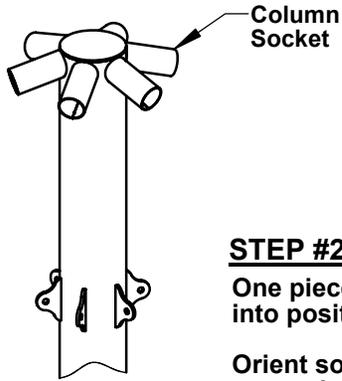
B

C

D



TWO PIECE COLUMN



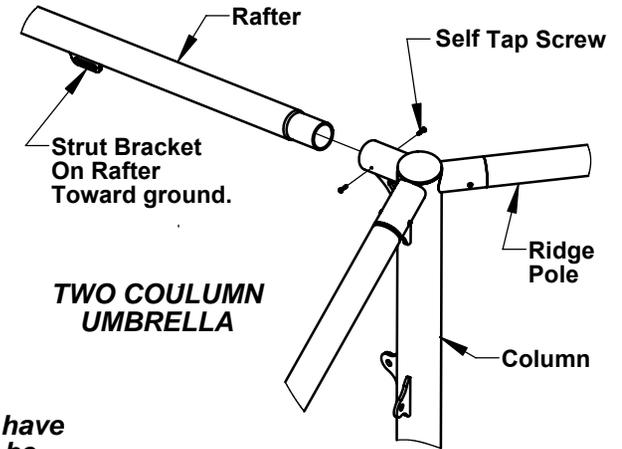
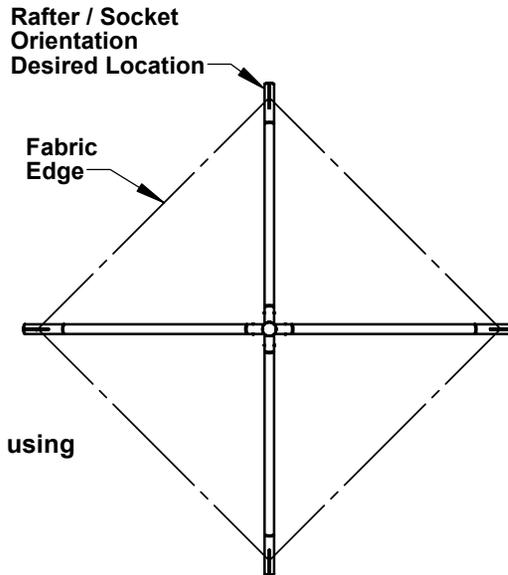
ONE PIECE COLUMN

STEP #2: Single Column

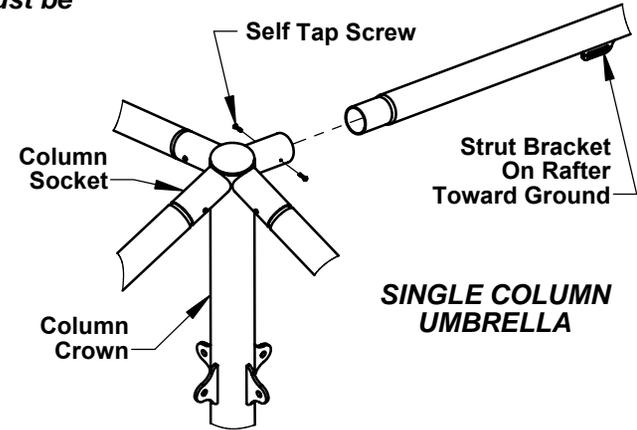
One piece columns must be rotated into position while concrete is still wet.

Orient sockets toward the desired fabric corner locations.

NOTE: With Two Column Umbrellas that have one piece columns, the Ridge Pole must be fitted before concrete is poured.



TWO COLUMN UMBRELLA



SINGLE COLUMN UMBRELLA

STEP #2: Crowned Columns

Smaller single column Umbrellas will have a separate Crown that will need to be placed over the swaged end of column after the concrete has hardened.

Orient the crown so that the sockets point toward the desired Fabric corner locations.

Field drill $\phi 9/16$ " through both walls of column using holes in crown as template (Two Locations).

Secure with two 1/2" hex head bolts and nuts.

STEP #3:

Insert swaged end of Rafters into column sockets.

Orient rafter strut brackets to point down toward ground.

Drill two pilot holes through each rafter using the holes in the socket as a template.

Secure with two self tapping screws

3

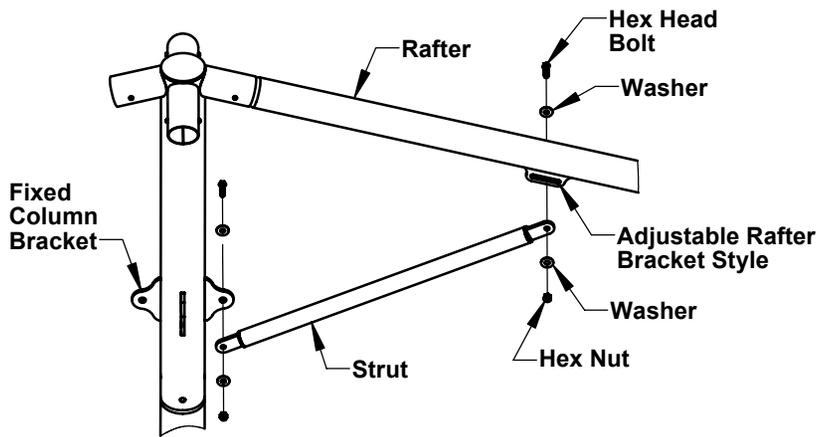
2

1

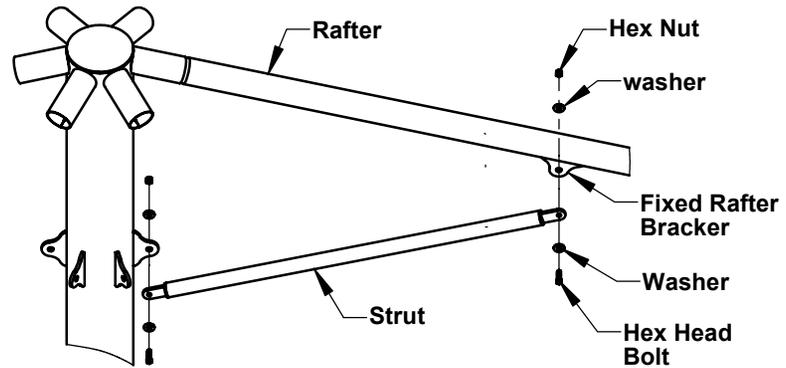
1

2

3



TWO PIECE SINGLE COLUMN UMBRELLA



ONE PIECE SINGLE COLUMN UMBRELLA

STEP #4:

Attach one strut to each rafter using short hex head bolts at both the column and rafter brackets.

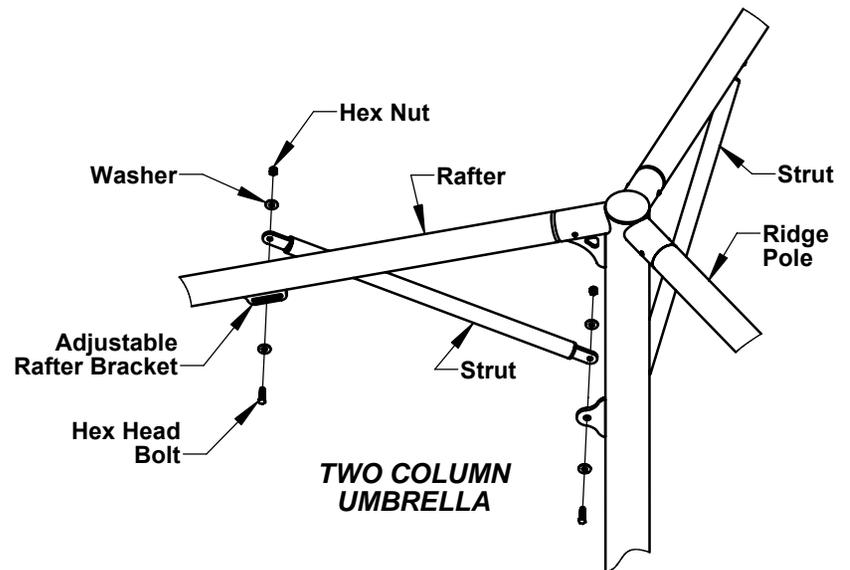
Starting with the rafters, insert a bolt through a washer and the rafter bracket. Hang the strut by inserting it over the bolt end.

Secure the strut by placing a second washer over the bolt against the rafter bracket. Hand tighten a nut against the washer.

Swing the strut bottoms into position aligning the end hole with the hole in the column bracket. Be sure that the strut end is on the same bracket side as the one at the top rafter position.

Secure the bottom end of strut into position against the column using the same hardware procedure used for the top.

Fully tighten all strut attachment hardware.



TWO COLUMN UMBRELLA

STEP #5

Unroll the umbrella fabric on a smooth flat surface with the hem side up.

Starting at one corner, insert the steel cable into the hem that runs along the fabric edge.

Feed the cable through the entire length of the hem until approximately 24" is left at the starting corner.

Re-insert cable into the adjacent hem at the second corner.

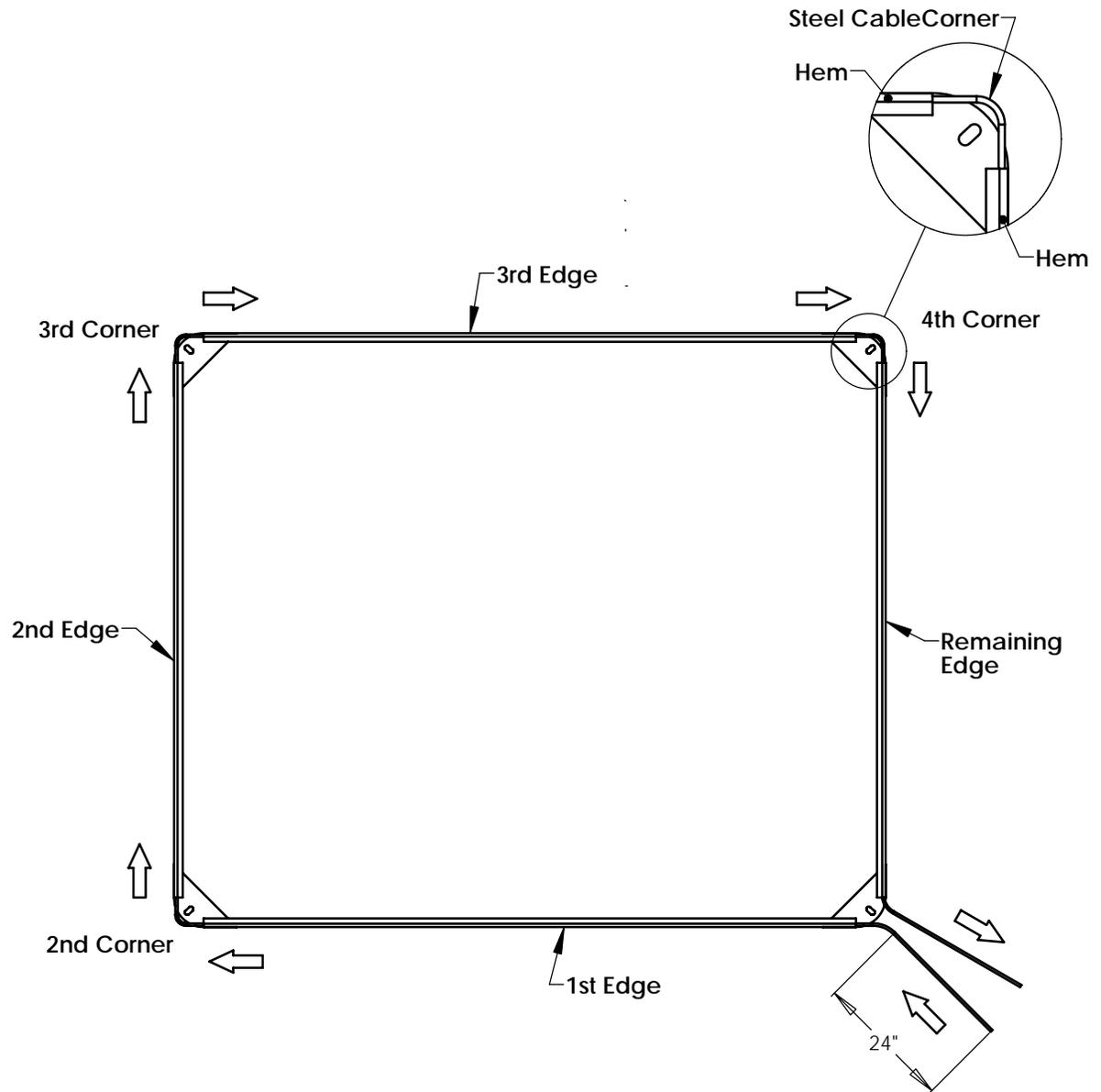
Feed the cable through the entire length of the second edge until only a small corner slightly larger than the fabric corners remains.

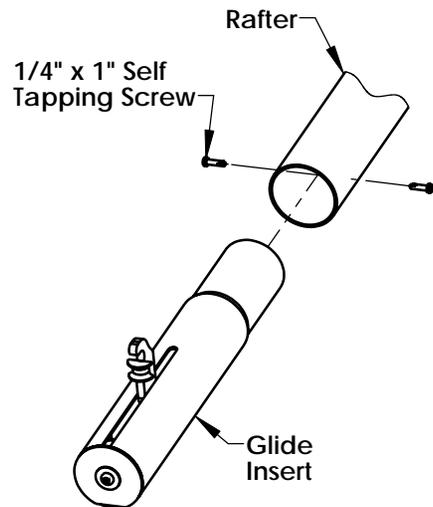
Re-insert the cable into the adjacent hem at the third corner.

Feed the cable through the entire length of the third edge until a small cable corner is formed at the third corner.

Repeat this procedure at the fourth corner feeding the cable through the remaining edge.

At this point you will have two loose ends at the starting corner.





STEP #6

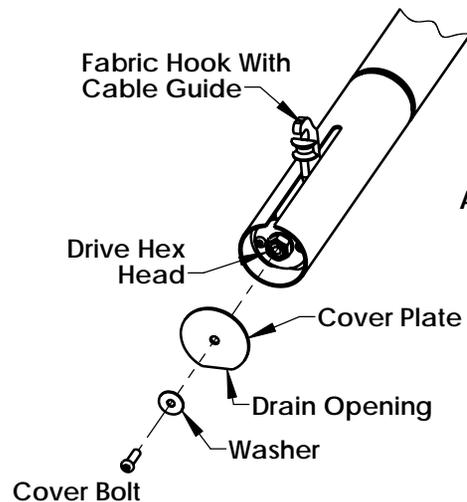
Locate the glide mechanisms that will go on the end of each rafter.

With the fabric hook oriented up away from the ground, insert the tapered end of the glide into the end of the rafter.

Using a $\varnothing 3/16$ " drill bit, drill a hole through both the rafter and glide from opposite sides.

Secure the glide to the rafter using two 1/4" x 1" self tapping screws and the tool provided.

Repeat this procedure at each rafter location.

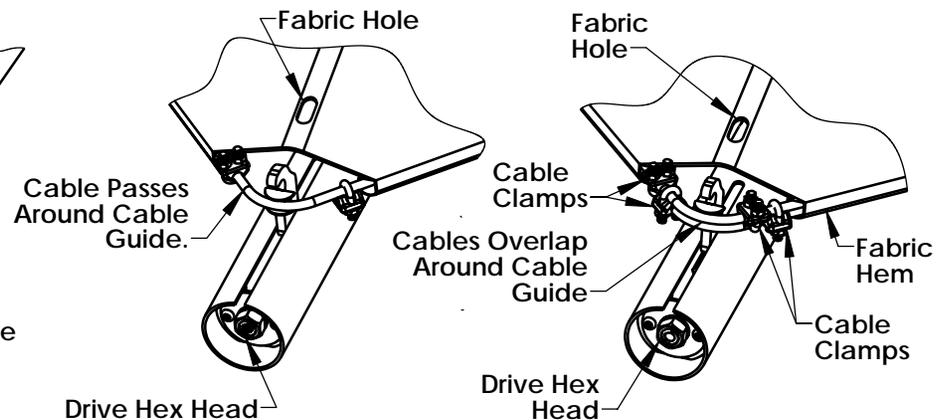


STEP #7

Remove the screw and washer that hold the protective cover on each glide end.

With the hem side down, gently lift the fabric up over the framework. Orient each fabric corner over a glide insert.

With a ratchet and socket, rotate the drive hex head at each location until the fabric hook moves up the rafter as far as it will go.



STEP #8

Start at one of the fabric corners with the cable running completely through.

Pull the cable over the hook and into the 180° cable guide. Push the hole in the fabric corner down over the hook portion.

Move to the next corner with the cable running completely through. Repeat the procedure.

NOTE: You will have to pull hard and stretch the fabric over the hooks, this is normal and ensures a tight fit.

At the final corner you will attach the loose cable ends by crossing them over each other and securing them with two cable clamps on each side of hook. Pull to remove any slack in cables before tightening clamps. Insert fabric corner over hook.

Tuck the loose cable ends back into the adjacent fabric hem.

Rotate the hex drive head on each glide the same number of turns until fabric is completely tight over frame.

Replace protective covers on glide ends making sure that the drain opening is oriented at the bottom.

WARRANTY

General Conditions:

- The warranty set forth shall be the purchaser's sole and exclusive warranty.
- All warranties below are effective from the date of installation by the company, its subsidiaries or agents.
- The company reserve the right to repair or replace any item covered by this warranty.
- This warranty will be void if the structures are not paid for in full.
- The warranty is void if the structures are not installed in strict compliance with the manufacturer specifications.
- Purchaser shall notify the company or its agent in writing detailing any defect for which a warranty claim is being made.
- The company shall not in any event be liable for indirect, special, consequential or liquidated damages.
- The company specifically denies the implied warranties of fitness for a particular purpose and merchantability.
- The warranty is void if any changes, modifications, additions or attachments are made to the structures or fabric without the written consent of the manufacturer.
- No signs, objects, ornaments, fans, lights, fixtures or decorations may be hung from the top part of the structure, unless specifically designed and engineered by the manufacturer. These items may interfere with the fabric causing the warranty to be voided.

Thread:

- The company warranties its sewing thread for a period of eight years.
- This warranties that the sewing thread will be free from defects in material and workmanship and will not be damaged by exposure to sunlight, weather and water.
- All other warranties are disclaimed.
- Labor for the removal, installation and/or freight charges, or tops with damage caused by thread will only be covered in instances where the company had installed the shade structures. In all cases where shade structures were not installed by Superior Shade or its agents, all labor for the removal, installation and/or freight will be at the customers' expense and the warranty will only be applicable to the repair or replacement of the defective materials.

Fabric:

- The company fabrics carry a ten-year manufacturer's warranty from the date of installation against failure from significant deterioration, breakdown, outdoor heat, cold or discoloration with the exception of the umbrella shade structures which carry a three-year warranty.
- All fabric curtains, valences and flat vertical panels are not covered under the warranty.
- Fabric is not warranted where it is installed on a structure that is not engineered and built by the company or its agents.
- This warranty shall be void if damage to or failure to the shade structure is caused by contact with chemicals, misuse, vandalism or any act of God, including but not limited to, ice, snow or wind in excess of the applicable building code parameters.
- All fabric tops are warranted for sustained winds up to 76mph (hurricane force 1) and for gusts of up to 3 seconds duration up to 90mph with no snow or ice accumulation.
- The structures have been designed to eliminate any friction between the rafters and the fabric. The warranty will, therefore, be voided if any modification (temporary or permanent) is made to the rafter, cross pieces or ridge beams.
- Labor for the removal, installation and/or freight charges will be covered in full for a period of **twelve months** where the shade structures supplied and installed by Superior Shade are defective. In all cases where the shade structures are not installed by the company or its agents, all labor for the removal, installation and/or freight will be at the customers' expense and the warranty will only be applicable to the repair or replacement of the defective materials.
- We reserve the right, in cases where certain fabric colors have been discontinued, to offer the customer a choice of available colors to replace the warranted fabric of the discontinued color. The company does not warranty that any particular color will be available for any period of time and reserves the right to discontinue any color for any reason it may determine, without recourse by the owner of the discontinued fabric color.

Steel:

- The structural steel frames are covered for a period of twenty (20) years against failure due to rust corrosion or faulty workmanship.
- Workmanship and painted surfaces are warranted for a period of twelve months. This warranty shall be void if damage to the steel frame or paint is caused by contact with chemicals, misuse, vandalism or any act of God, including but not limited to, ice, snow or wind in excess of the applicable building code parameters.

Acts of Nature:

- This warranty does not cover natural disasters, such as earthquakes, shifts of terrain or tornados. If the structure is installed in an area exposed to hurricanes, removal of the shade fabric is required when a hurricane warning is issued.
- Structures are warranted for winds up to 145mph only if shade canopies have been removed as per requirement set forth above in the **Fabric** paragraph. Removal and reinstallation must be performed by an authorized the company installer unless otherwise specified in writing.

Installation:

- Labor for the removal, installation and/or freight charges will only be covered in instances where we or its agents have installed the shade structures. In all cases where units were not installed by the company or its agents, all labor for the removal, installation and/or freight will be at the customers expense and the warranty will only be applicable to the repair or replacement of the defective materials.

APPENDIX A PROPER CARE, MAINTENANCE AND SAFE REMOVAL OF THE SHADE CANOPY

THINGS TO AVOID

SNOW, ICE and HIGH WINDS: Remove the canopy in winter conditions, ice and snow load are not covered by the warranty. The same goes for winds in excess of hurricane force 1.

SHARP OBJECTS: Always avoid dragging the fabric across surfaces, etc. Roll or fold the fabric and carry it. Avoid sharp objects, bolts, snags, and other protrusions including mounting hardware.

OBSTRUCTIONS: Keep foliage, such as tree limbs, shrubbery, bushes, etc. trimmed back and away from fabric at least three to four feet.

SOURCES OF HEAT: Also avoid contact with heat sources such as hot lights, torches, and avoid using grilles, etc. under the fabric.

CLEANING THE FABRIC

The fabric itself is generally maintenance free with the exception of necessary removal due to weather or seasonal requirements. The fabric does not harbor mildew or mold, but residues may. Residues such as tree sap, leaves, bird droppings, dust & dirt, etc. may need to be removed. To clean the fabric, use water and mild soap. A soft mop or soft broom may also be used. Cleaners that do not contain hydrocarbons, solvents, bleach or ammonia may be used. Use of solvents, hydrocarbons, bleach, and ammonia type cleaners will void the fabric warranty. A pressure washer may be used if necessary using a wide-spray nozzle.

CABLES AND HARDWARE

It is recommended that the cables be replaced if corrosion is visible, or every 3 to 4 years whichever comes first. The cable ends must be wrapped with tape to secure any wires thus preventing the wires from tearing the fabric. Taping must be done when removing old cable as well as when installing new cable. Clamps should be replaced when the cable is replaced.

If the cable appears slack on a still day (no wind), immediately have the cable and clamps retightened by a qualified person. The cable should not be slack.

GLIDE ELBOWS

Lubricate glide elbows annually, and before operating. A waterproof grease is recommended such as a lithium based grease or anti-seize thread lubricant.

STORAGE

Fabric must be stored in clean dry place free from snags, sharp edges, etc. The storage area must be rodent-free. Wrap all hardware fittings with rags, etc. as they can damage the fabric.

UNINSTALLING THE SHADE CANOPY

NECESSARY CARE

It is important to take **necessary care** when handling the fabric during removal and installation to prevent damage to the fabric as well as **SAFE control of the fabric in a breeze or wind**. The fabric is tough and engineered for use as a shade, but it can tear or cut when or if pulled over a snag or sharp item; it can puncture from bolts or other protruding objects; and it can melt from things like cigarettes, matches, hot torch tips, sparks and the like. In addition, care must be exercised to avoid the fabric hooks after the fabric is unhooked from the elbow corners and sides of the structure where there are intermediate supports. It is best to wrap any connected mounting hardware to prevent it from harming the fabric.

PROPER AND SAFE

Based on the size of the canopy, several persons may be needed to **properly and safely handle** the fabric during the uninstalling process. You will need several commercial ladders or other means to work safely at heights such as scissor lifts, etc. It is advised that you pad the post side of the ladder and tie the ladder to the post. The pad is to protect the post finish. Also keep in mind that every 100 square feet of fabric (10' X 10') weighs approximately five pounds; a large canopy can get heavy fast. For proper control of the fabric, read below. It is best to remove the fabric on a still day. **Do not attempt to remove the canopy in strong or gusty winds.**

INSTALLATION IN REVERSE

Refer to the **Installation Instructions pages 7 and 8 (enclosed)**. Determine which style elbows (corners) are installed on your structure. Begin on page 8, at either Step 11 or Step 9 - depending on which style elbow is on your structure. In general, uninstalling the canopy means following these pages in reverse. **Do not attempt to remove the canopy in strong or gusty winds.**

1. For shade structures with Standard Elbows, loosen the turnbuckle several turns in order to put enough slack in the cable to allow the fabric and cables to unhook from all the elbow hooks. **Attach 3/8" or larger ropes** to each corner of the fabric and cable before unhooking to secure and properly control the fabric from ground level. If uninstalling in breezy conditions, choose the windy side of the fabric and tie these corners to the posts with the ropes with enough slack to allow for unhooking the fabric from the structure. These ropes are to prevent the shade from flying away in the breeze and to help prevent injury to ground personnel. Once the corners have been secured to the posts, unhook the fabric and cables from each corner.

On the side away from the wind, release the corners of the fabric and cable and have a person hold on to each rope. It may help to wrap the rope around a column to help hold it from getting caught in the wind. Fold the fabric back away from the hooks.

Now it will be necessary to remove the cable clamps to allow the cable to be free from the structure and the turnbuckle. If the cable ends are frayed, wrap them with tape. NOTE: It is usually not necessary nor is it recommended that the cable be removed from the canopy.

With a person on each rope, starting at the windy side, gently pull the canopy down in between the framework of the structure. The side away from the wind can be guided with the ropes toward the persons pulling the canopy down.

IMPORTANT HINT: It is important when reinstalling the canopy, that it is put back in its original orientation to the structure. Starting at the turnbuckle corner, the fabric and cable corners should be returned to their original positions.

2. For shade structures with Glide Elbows, remove the protective covers from the ends of the glide elbows. Then, using the proper wrench, turn the hex nuts on the end of the Glide Elbow to run the glide hooks to their top most position. Do not loosen the cable clamps, leave the cable intact. **Attach 3/8" ropes** to each corner of the fabric and cable before unhooking to secure and properly control the fabric from ground level. If uninstalling in breezy conditions, choose the windy side of the fabric and tie these corners to the posts with the ropes with enough slack to allow for unhooking the fabric from the structure. These ropes are to prevent the shade from flying away in the wind and to help prevent injury to ground personnel. Once the corners have been secured to the posts, unhook the fabric and cables.

On the side away from the wind, release the corners of the fabric and cable and have a person hold on to each rope. Fold the fabric back away from the hooks.

It is a good idea to put the Glide Elbow protective covers back in place. NOTE: With Glide Elbow installations it is not necessary to loosen or remove the cable clamps nor to remove the cable from the canopy. If the cable ends are frayed, wrap them with tape.

IMPORTANT HINT: When uninstalling the canopy, mark or identify the corner of origin in such a way that when reinstalling the canopy, it is put back in its original orientation to the structure. The fabric and cable corners should be returned to their original positions when reinstalling the canopy. The cable and fabric should tighten properly when the glide elbows are adjusted down into their tension positions.

3. For shade sails equipped with fans, loosen the adjustable threaded rod several turns in order to put enough slack in the cable to allow the shackle pin to be removed (do not remove the pins until the fabric corners have been secured with ropes). **Attach 3/8" or larger ropes to each corner** of the fabric and fan before unhooking to secure and properly control the fabric from ground level. If uninstalling in breezy conditions, choose the windy side of the fabric and tie these corners to the posts with the ropes with enough slack to allow for unhooking the shackle from the structure. These ropes are to prevent the shade from flying away in the breeze and to help prevent injury to ground personnel. Once the corners have been secured to the posts, unhook the shackles and lower the fabric and cables to the ground.

REINSTALLING HINTS

Using the same rope technique, install from the windy side (if it is breezy) making sure to secure these ropes to the posts. Then, throw the remaining corner ropes over the structure and gently pull the canopy into position. The cables and fabric corners can now be hooked on the hooks (and cable guides if so equipped). Next reinstall the clamps if applicable and tightened the cable with the turnbuckle or the Glide Elbows. **Do not attempt to install the canopy in strong or gusty winds.**

For help call TreeTop Products at 1-866-511-5642

See Install instructions pages 7 & 8 attached

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 1/4” 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.

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ASTM D3363-92A	Pencil hardness	H-2H
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