

1. Safety

When handling cured Carbon fibre, there is a risk of damage to skin from sharp slivers.
 Wear long sleeves and heavy duty gloves.
 Use barrier cream to reduce irritation from carbon dust.
 Safety goggles and a **face mask** should be worn when cutting, sanding or drilling the tube.
 Latex gloves should be worn when handling the mixed adhesive during join assembly.
 A vacuum cleaner is highly recommended for frequent removal of dust.

2. Tools & Materials

2.1 Normal hand & power tools used in spar making will be sufficient. Standard HSS drill bits etc. will damage the laminate. Dagger drill bits, jigsaw and holesaws with abrasive blades are essential. For cutting the tubes, a special diamond edged hacksaw blade will be required. These can be purchased from Seldén Mast (item number 592-102).

3. Drilling instructions for all Carbon Spars

Important:

To drill holes in carbon, use 'Dagger' drill bits supplied from Seldén Mast. These bits are specially designed to cut carbon material. An alternative is to use bits for ceramic tiles

- 3.1 Mask off area around hole position using masking tape.
- 3.2 Use correct sized 'Dagger' or ceramic tile drill bit.
- 3.3 Set drill speed according to the Table below:

"Dagger" Drill Bit		
Diameter (mm)	Drilling Speed rpm)	Item No:
4.1	2330	592-079
4.8	2000	592-080
6.4	1500	592-081

3.4 Support the weight of the drill, position the drill bit, and start carefully drilling. Continue supporting the weight of the drill, and allow the drill bit to cut through the material. Do not apply any pressure. Just before the drill bit breaks through the inner carbon surface, give even more support to the drill. This reduces the chance of breaking fibres, and produces a cleanly cut hole.

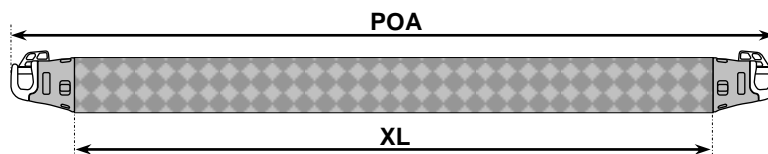
CARBON POLE ASSEMBLY

Important:

All metal surfaces, including fastenings, that contact carbon fibre must be insulated

4. Tube Preparation

To achieve the correct finished pole overall length (POA), use the table offsets listed in the relevant page PS649, PS651-1 or PS651-2 (below)



4.1 Mark the cut position with a grease pencil or white typist's correction fluid. To ensure a correct pole structure, the ends of the tube must be precisely cut and square.

4.2 Using the special blade fitted into a hacksaw, cut the tube. To avoid a ragged edge, it is essential that the cutting action is only towards the inside of the tube. Rotate the tube frequently during the cutting process, and cut on the down stroke at the same end of the cut slot. Smooth even strokes are more effective than short strokes.

5.1 Pole Assembly, End-for-End (Type A) SC047, SC059, SC077, SC088, SC090

Mark and drill rivet holes for ends as shown in PS659 (page 3).

Fit TWARON® reinforcement if required. See 595-411-E (pages 8 & 9).

If the pole is $\varnothing 39$, attach self adhesive spacer shims to the pole ends curved sides & lower c/line Fig A below.

If the pole is $\varnothing 47$, attach self adhesive spacer shims to the pole ends curved sides as Fig B below.

If the pole is $\varnothing 59$ or $\varnothing 61$, attach 4 self adhesive spacer shims to the pole adapter curved sides as Fig C below.

If using 4 shims makes the fit too tight, use 3 only. These must be on the curved surfaces.

Clear dust, push ends into place.

Drill through existing holes, then rivet ends in place.

Complete as diagram PS649

Fit bridles if required. Instructions are 595-412-E (pages 6 & 7).

Figure A



One shim
on each top
quarter

Two shims
on the lower
c/line

Figure B



Self adhesive shims (4) on curved surfaces

Figure C



5.1 Pole Assembly, Dip Gybe (Type B) SC077, SC088, SC090

Drill rivet holes for ends as shown in PS650-1 or PS650-2 as appropriate (pages 4 & 5).

If 534-777 outboard ends are to be fitted, take care not to allow carbon dust or aluminium debris to contaminate the plunger mechanism. Before drilling rivet holes, wipe grease from plunger.

After drilling, move end fitting away from pole, remove any contamination and re-grease plunger.

Fit TWARON® reinforcement if required.

Drill holes for lift eye. Fit eye & backing plates.

Fit extra exit boxes if required. Cut the oval hole with a router or small hand power tool (Dremel).

Rig internal operating lines & topping lift retract cord (if required).

Clear dust, rivet ends in place.

Complete as diagram PS650-1 or PS650-2

Included Diagrams

PS649 Diagram End-For-End Pole (Type A)

PS650-1 Diagram Dip Gybe Pole, (Type B) with 534-854 outboard end

PS650-2 Diagram Dip Gybe Pole, (Type B) with 534-777 outboard end

595-412-E Instructions for Bridles.

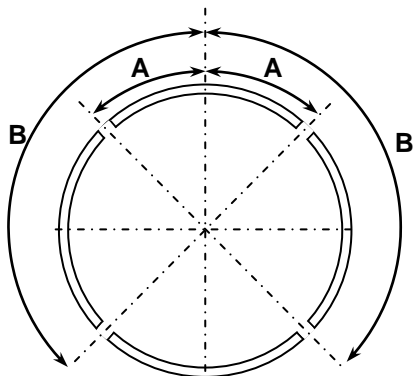
595-411-E Instructions for TWARON® reinforcement.

Rev.	Qty	Revisions	Date	Initials
2	1	Reference to whisker pole label added	060209	jp
3	4	New design pole ends introduced, extra exit boxes added	060913	jp
4	4	Rivet positions added	070417	jp
5	2	SC039 & SC090 added	080423	jp
6	2	SC077 was SC076, rivet diameters added	100728	jp

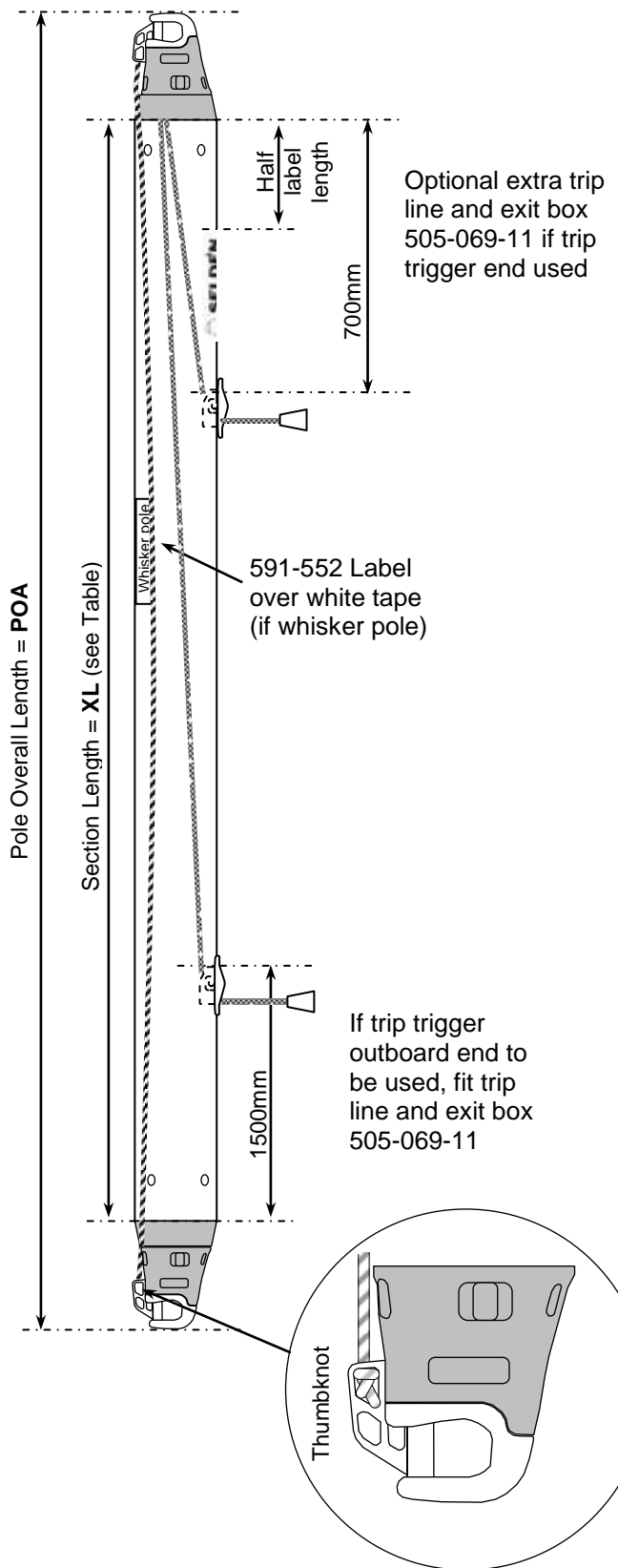
Total Pole End Deductions (POA - XL)		
Pole	Seldén Pole End Type	Total Ends Deduction (mm)
SC039	534-900	120
SC047	534-865	180
SC059	534-865	220
SC061	534-865	220
SC077	534-854	190
SC088	534-854	230
SC090	534-854	230

Pole End Rivet Positions			
Pole	Sélden Pole End type	Dimn A (mm)	Dimn B (mm)
SC039	534-900	20	61 (single)
SC047	534-865	18	55
SC059	534-865	23	70
SC061	534-865	23	70
SC077	534-854	30	90
SC088	534-854	35	104
SC099	534-854	35	104

All rivets 20mm from edge of tube



Rivet Sizes	
SC039 to SC077	ø4.8
SC088 to SC090	ø6.4



References

Rivet positions	PS410
Logo position	595-938-E



Standard Layout, Cbn SC039 to Cbn. SC090

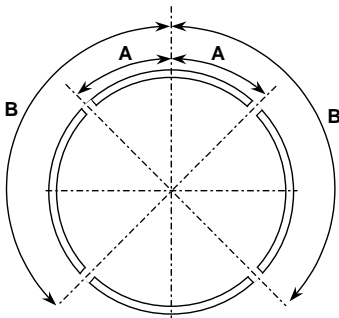
File: 3000

Drawn: JP	Date: 070417	Scale: n/a	Replacing / Replaced by:	Approved:	Dwg. No. PS649
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Rev.	Qty	Revisions	Date	Initials
2		Downhaul loop added	070130	jp
3		Rivet positions added	070417	jp
4		SC090 added	080423	jp
5	2	SC077 was SC076, rivet diameter added	100728	jp

Pole End Rivet Positions			
Pole	End	A mm	B mm
SC077	Outboard 534-854	30	90
	Inboard 534-778	40	85
SC088	Outboard 534-854	35	104
SC090	Inboard 534-778	45	90

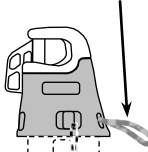
All rivets 20mm from edge of tube



Rivet Sizes

SC077	ø4.8
SC088 & SC090	ø6.4

Downhaul loop.
330mm x ø5mm HMPE
(see 595-267-E)



It T/lift retract to be used, add extra small block & lashing (see MB 3040-3)

Release line
L= POA
(for manuf.)

Alt. extra release line exiting via forward box
L= 1000
(for manuf.)

Alt. release line exiting via box
L= POA -1000
(for manuf.)

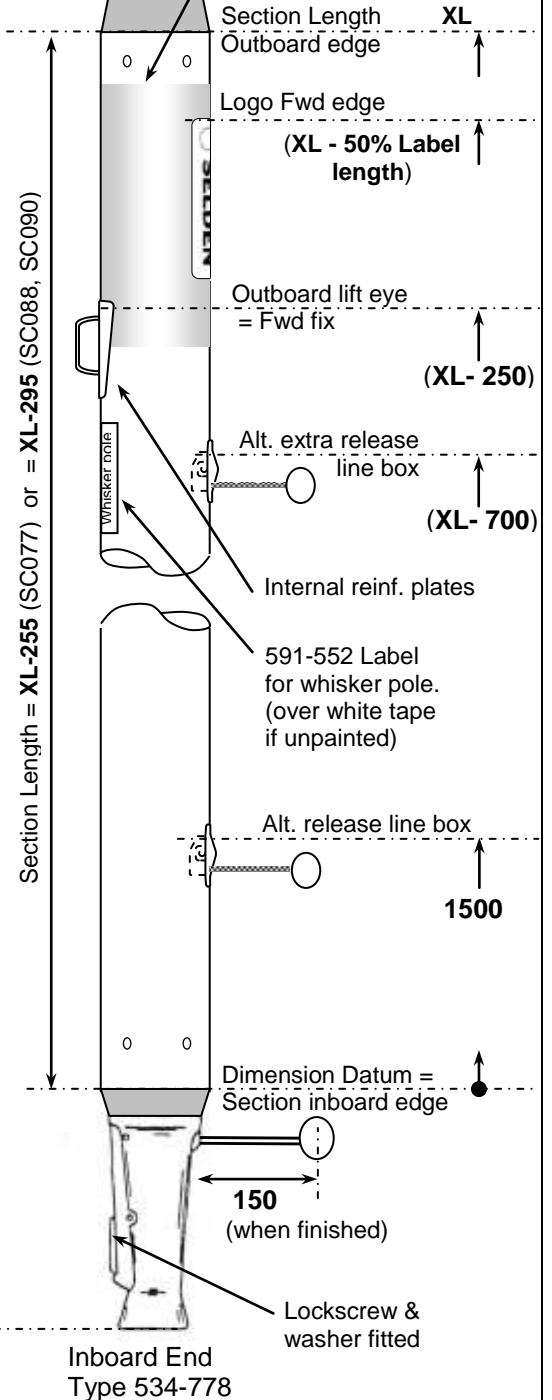
Topping lift retract (Optional)
L= (2xPOA) - 400

Running knot

Clip 301-039

Outboard End
Type 534-854

If TWARON® rienf. used, standard position is 40 from outboard end.



References

Rivet positions	PS410
Logo position	595-938-E

SELDÉN

Standard Layout, Cbn SC077, SC088 & SC090 Dip Pole with 534-854 Outboard End

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Drawn: JP Date: 060913 Scale: n/a

Replacing / Replaced by:

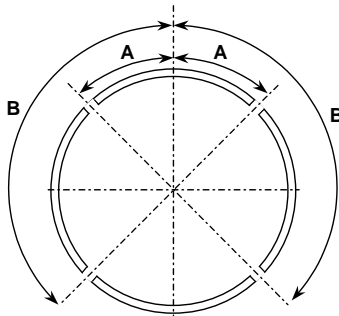
Approved:

Dwg. No. **PS650-1**

Rev.	Qty	Revisions	Date	Initials
1		Rivet positions added	070417	jp
2		SC090 added	080429	jp
3	2	SC077 was SC076, rivet sizes added	100728	jp

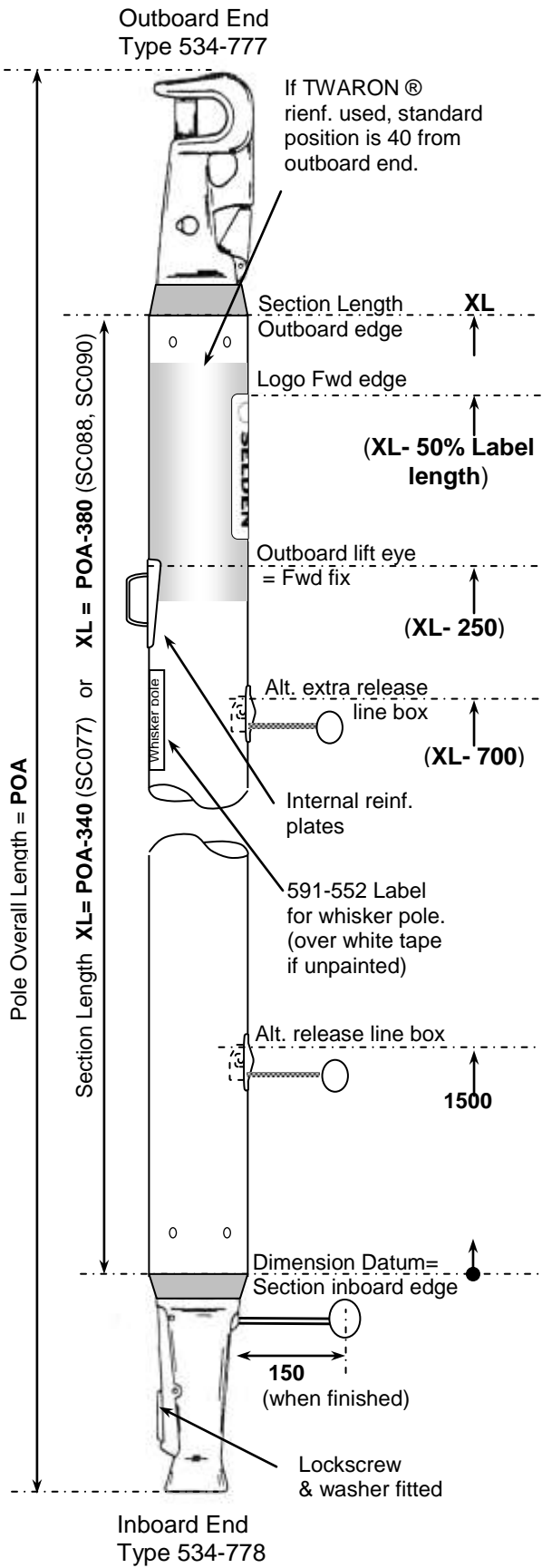
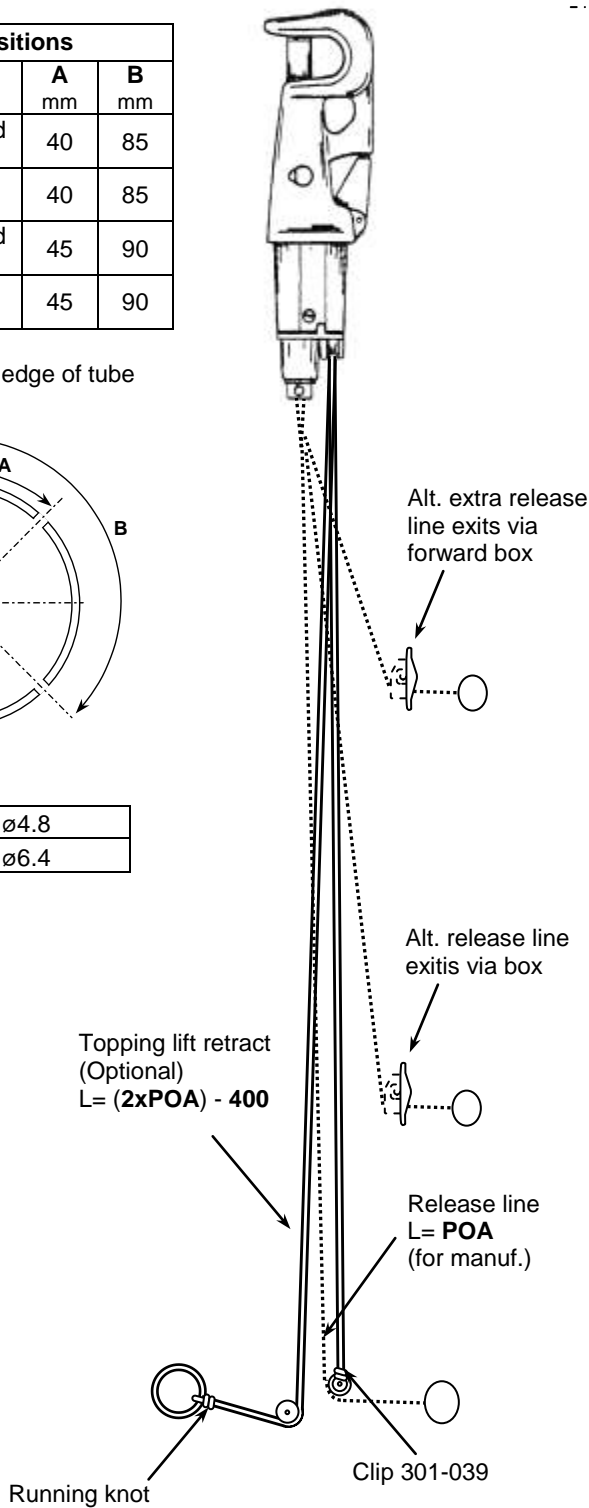
Pole End Rivet Positions			
Pole	End	A mm	B mm
SC077	Outboard 534-777	40	85
	Inboard 534-778	40	85
SC088 SC090	Outboard 534-777	45	90
	Inboard 534-778	45	90

All rivets 20mm from edge of tube



Rivet sizes

SC077	ø4.8
SC088 & SC090	ø6.4



References

Rivet positions	PS410
Logo position	595-938-E



Standard Layout, Cbn SC077, SC088 & SC090 Dip Pole with 534-777 Outboard end

File: 3000

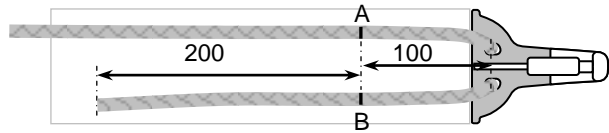
Drawn: JP	Date: 070417	Scale: n/a	Replacing / Replaced by:	Approved:	Dwg. No. PS650-2
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Bridles for carbon poles are made from 100% HMPE rope. This has minimal stretch, and does not damage the pole's surface when stowed on deck.

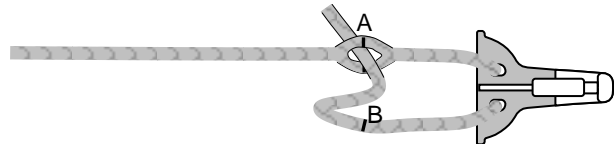
Method

Pre Assembly

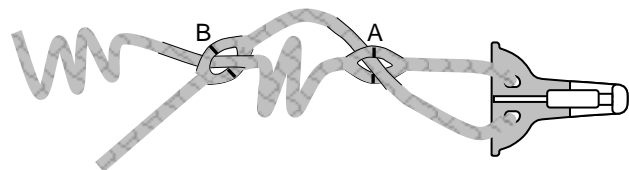
1. Cut the rope into equal lengths.
2. Feed one end of each through the pole end fitting.
3. Make marks A and B as shown.



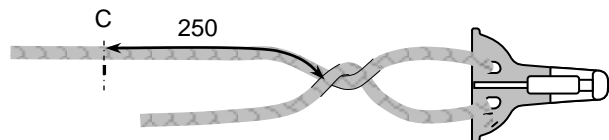
4. Feed the short end through the long part at A.



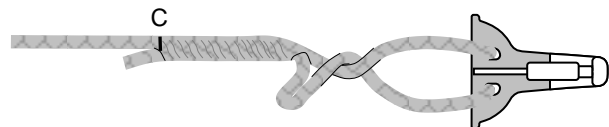
5. Feed the long part through the short end at B.



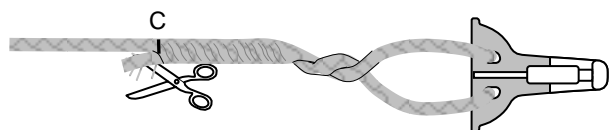
6. Pull the two loops together. Make a mark at C



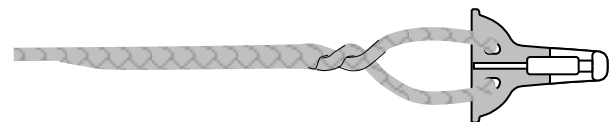
7. Feed the short end through the middle of the long part, to exit at C.



8. Taper the short end by cutting 6 strands as shown.



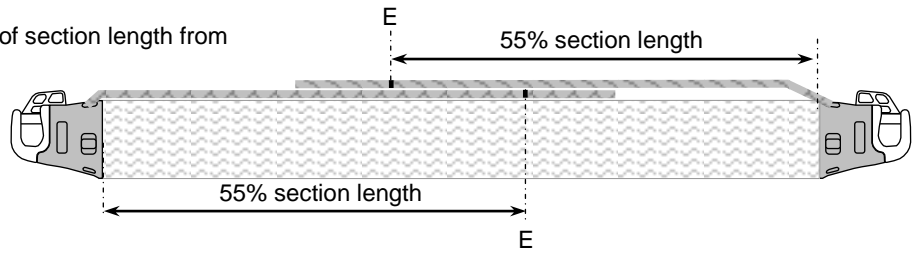
9. Smooth the long part away from the splice to swallow the short end.



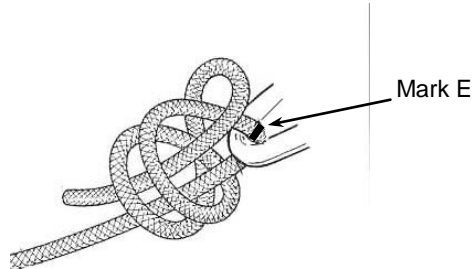
Final Assembly

4. Lay each bridle line along the pole section.

5. Mark each line at **E**, 55% of section length from end.



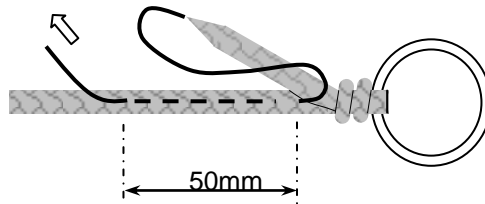
6. Tie each bridle part to the central ring using a Running Knot. Ensure that the marks are as shown.



7. Using a splicing needle, feed each free end into the centre of it's standing part close to the knot, and out again 50mm from the knot.

8. Pull the free end and cut at 10mm closer to the knot than the exit. Taper the cut end.

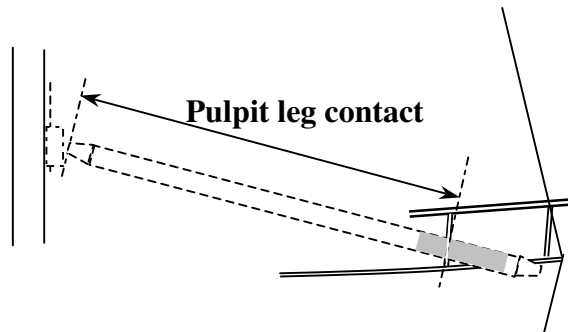
9. Smooth the outer to swallow the cut end.



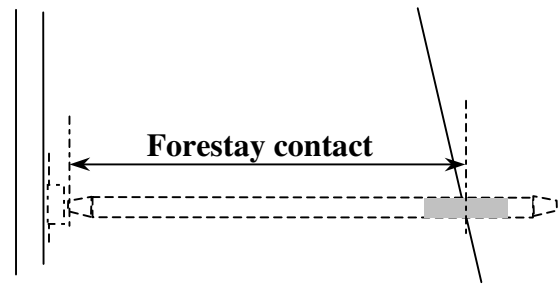
The external **TWARON®** protective wrap for carbon poles is intended to improve chafe resistance. Type A poles (End-for-End Gybe) have two wrapped areas, Type B poles (Dip Gybe) have one wrapped area.

The wrap can be positioned to suit the intended operating or stowage method:-

1. Chafe protection when stowed on the toe rail. This is the standard position.
The wrap starts 40mm from the tube outer edge.
2. Chafe protection when the pole comes into accidental contact with the forestay.



Wrap in standard position, with its outer edge 40mm from the tube's outer edge.



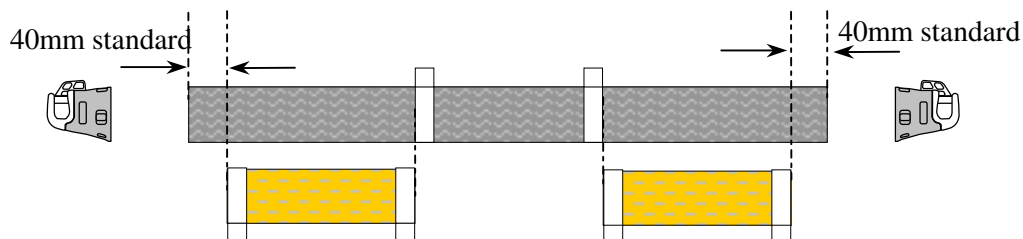
Wrap positioned aft of standard, to protect against chafe due to accidental pole contact with forestay

SAFETY

When handling cured Carbon fibre, there is a risk of damage to skin from sharp slivers.
Wear long sleeves and heavy duty gloves.
Use barrier cream to reduce irritation from carbon dust.
Safety goggles and a **face mask** should be worn when cutting, sanding or drilling the tube.
Latex gloves should be worn when handling the mixed adhesive during join assembly.
A vacuum cleaner is highly recommended for frequent removal of dust.

Preparation.

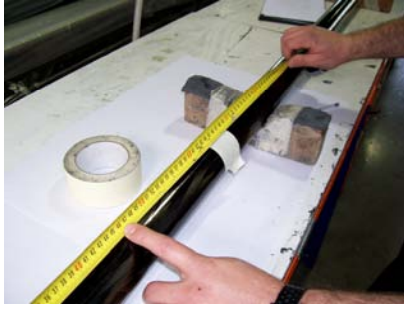
Ensure that the work area is clean and well ventilated. Select a stable work surface.
If the pole already had it's ends fitted, remove these.
Wipe the tubes clean with a soft rag.
Rest the carbon tube on chocks with soft padding.



Wrap position

Using the suggestions above, select the optimum location for the wrap. This will usually be the standard position. Apply a protective layer of masking tape around the pole tube and wraps as shown above.

Fitting method



1. Apply a layer of masking tape around both ends of the the wrap. Finish with a “pull off” tab of tape.



2. Apply a series of lines (5~6) of marine grade silicone sealant to the pole tube



3. Spread the sealant into an approximately even layer over the tube.



4. Slide the wrap onto the tube, using a twisting motion. This helps to spread the silicone.



5. As the wrap moves, a large excess bead of silicone will develop.



6. Spread this ahead of the wrap using a wooden spatula or similar soft tool.



7. When the wrap reaches the inner tape, remove excess silicone.
Remove the tube’s tape, pulling slightly towards the wrap. This will produce a neat edge of silicone.
Remove the wrap’s tape.



8. Apply black self adhesive tape (supplied with the kit) to cover the wrap end.

Pull it tightly to avoid creases.



9. Smooth the tape firmly in place.

10. Refit the pole ends.