ACTIVEVISTA

CATERPILLAR TUNNEL

COCOON PRO™

4.9M WIDE x 1.5M HOOP SPACING

ASSEMBLY AND INSTRUCTION MANUAL

Cocoon Pro™
4.9m x 1.5m Hoop Spacing Tunnel Kit

Commercial low-tech, moveable season extension tunnel.
1.5m hoop spacing, 4.9m (W) x 2.75m (H) x 7.5m - 40m (L) variants..

About this guide

Although this guide is extensive it has been made to cover all aspects of the build. The contents page provides easy to find Step by Step page references, each with parts listed and descriptive images.

You may only need a small amount of this information to complete your build and can refer back to it as required.

If you do have questions our direct contact is noted on the last page.

Thanks for choosing our purpose designed Caterpillar Tunnel.

ActiveVista's Cocoon Pro™ Tunnels are suitable for upgrading with the following Caterpillar Add-on Kits:

- Single and Double Sliding Door End Wall Kit
- Single Zip End Wall Kit
- Double Zip End Wall Kit
- End-Hoop - Purlin Brace Kit
- Trellis Cable Kits
- Cross Bracing Kits
- Overhead Irrigation Kit

ACTIVEVISTA

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Component List

Caterpillar Tunnel Cocoon Pro 4.9m x 1.5m Hoop Spacing Kits Include:

Label	Description	7.5M	10M	15M	20M	25M	30M	40M
A1	Hoop Section - Curved Side 2470mm x 32mm w/ swaged end, 2mm steel	12	16	22	30	36	42	56
A2	Lift Section 400mm x 32mm w/ swaged end, 2mm steel	12	16	22	30	36	42	56
B	Hoop Section - Curved Side 2470mm x 32mm w/o swage, 2mm steel	6	8	11	15	18	21	28
C	Anti-Billow Rope - UV treated, Braided Poly Spool 230m x 5mm	0.5	0.5	1	1.5	2	2	3
D1	Star-Lock Kit - 900mm Heavy Duty Star Picket	4	4	4	4	4	4	4
D2	Star-Lock Anchor Plate - FL/RR 4mm 304 grade Stainless Steel	2	2	2	2	2	2	2
D3	Star-Lock Anchor Plate - FR/RL 4mm 304 grade Stainless Steel	2	2	2	2	2	2	2
E1	Purlin Section - 2.5m x 32mm w/ swage, 1.5mm tube steel	3	4	6	8	10	12	16
E2	Aluminium Cross Connector Pair - Centre-Purlin Kit, 32mm	4	6	9	13	16	19	26
E3	Purlin-End Saddle 32mm	2	2	2	2	2	2	2
E4	Purlin-End Cap 32mm	2	2	2	2	2	2	2
E5	Optional Purlin Section - 32mm w/o swage	0	1	0	1	1	0	1
F	Greenhouse Film 180um, 8.5m width. Roll in metres (min length)	13	16	21	27	32	36	46
G	Footing Rods - 1000mm x N18 Rebar	4	4	4	4	4	4	4
H	Footing Rods - 1000mm x N16 Rebar	8	12	18	26	32	38	52
I	Anchor Plate - 4mm 304 grade Stainless Steel	8	12	18	26	32	38	52
J	Carabiner - 6mm 316 grade Stainless Steel	12	16	22	30	36	42	56
K	Short Bolts (3/8" Hex head) for 'hoop 3' Wind Bracing and Star-Lock Kit	8	8	8	8	8	8	8
L	14g x 20mm Self Drilling Screw (3/8" head)	80	110	130	170	200	220	300
M	3/8" Nutsetter/Driver for 14g Screws	1	1	1	1	1	1	1
N	Yellow Safety Caps for Star Pickets - Star-Lock Kit	4	4	4	4	4	4	4
O	Greenhouse Solar Seal Woven Repair Tape 72mm x 25m	1	1	1	1	1	1	1
P	Side Curtain Hook - 304 grade Stainless Steel	4	4	6	6	8	8	12
Q	2000mm Double Layer Locking channel - Aluminium	8	8	8	8	8	8	8
R	12g x 20mm Self Drilling Screw (5/16" head)	70	70	70	70	70	70	70

Component List *continued...*

Caterpillar Tunnel Cocoon Pro 4.9m x 1.5m Hoop Spacing Kits Include:

Label	Description	7.5M	10M	15M	20M	25M	30M	40M
S	2200mm Wiggle Wire - 304 grade Stainless Steel	8	8	8	8	8	8	8
T	5/16" Nutsetter Driver for 12g Screws	1	1	1	1	1	1	1
U1	32mm Brace Band (for Star-Lock Kit and Wind Bracing)	20	20	20	20	20	20	36
U2	Galvanised Cup Head Bolt for Brace Band	20	20	20	20	20	20	36
U3	Galvanised 14mm Nut for Brace Band	20	20	20	20	20	20	36
V	Wind Bracing Poles. 1.8m x 32mm - Wind Bracing Kit	8	8	8	8	8	8	16
W	Medium Duty Gloves	2	2	2	2	2	2	2
X	Number of Hoops	6	8	11	15	18	21	28

Component Reference Guide

A1

A2

B

C

D1

D2

D3

E1

E2

E3

E4

E5

Component Reference Guide

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U1

U2

U3

V

W

Tools Required

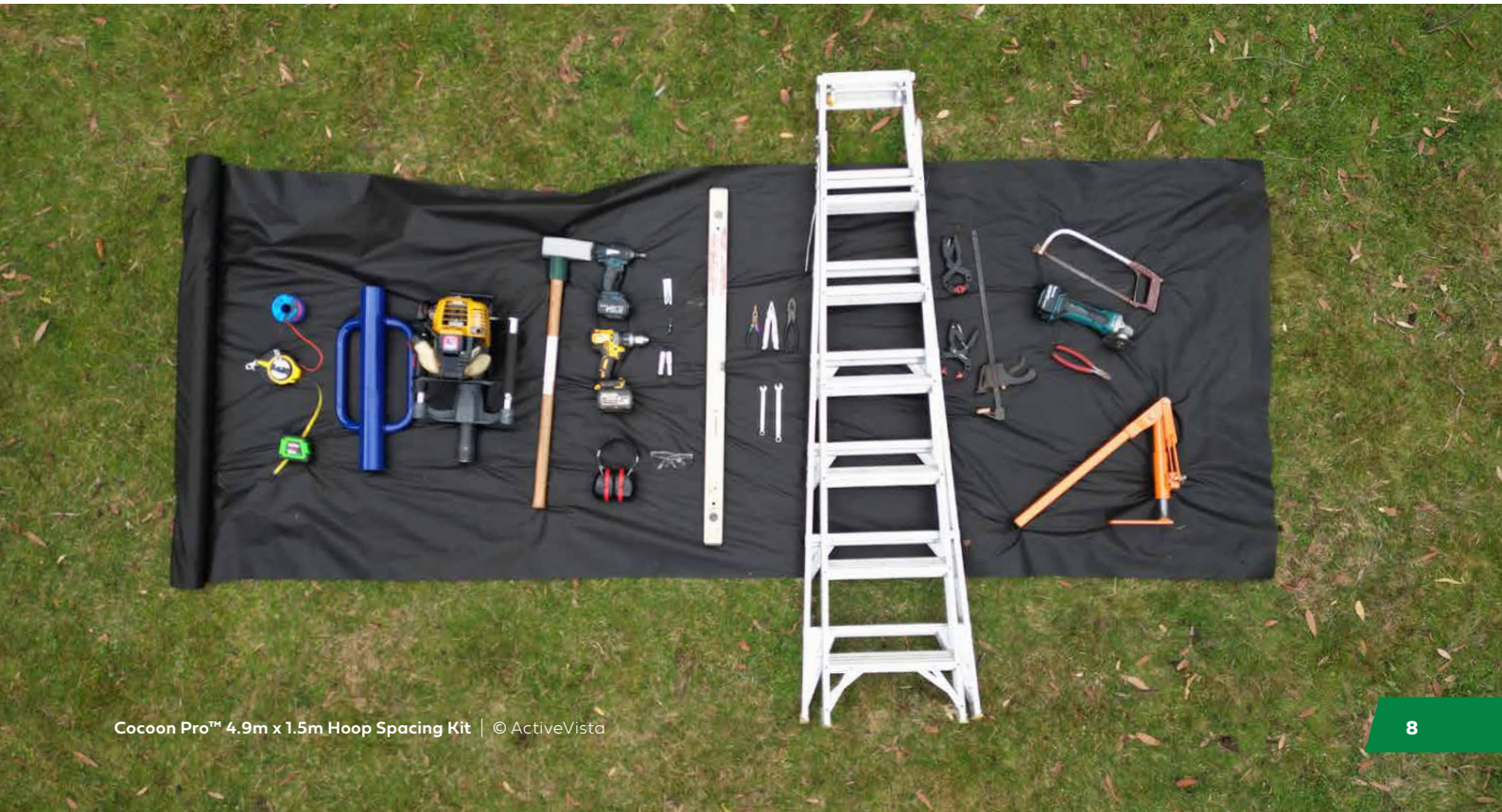
A smooth setup starts with the right prep. Make sure you've got the necessary tools sorted before you move onto the assembly.

Required:

- **Safety glasses**
- **Post driver** or **Sledge hammer**
- **18V Drill** or **Impact Driver**
- **5/16" and 3/8" Driver bit** (included)
- **13mm Spanner**
- **14mm Deep socket** or **Spanner**
- **2 x Pliers**
- **Tin snips, Cut off wheel** or **Hacksaw**
- **Ladder/s** (with functional safe height to suit this construction process)
- **Tape measure** (5m plus)
- **Long tape measure** (longer than tunnel)
- **Scissors** or **Knife**
- **Marker pen**

Recommended:

- **Stringline**
- **Earmuffs**
- **Post puller**
- **Spirit Level**



Cocoon Pro™ 4.9m x 1.5m Hoop Spacing Kit | © ActiveVista

DIAGRAM 1 – Tunnel and Diagonal Length

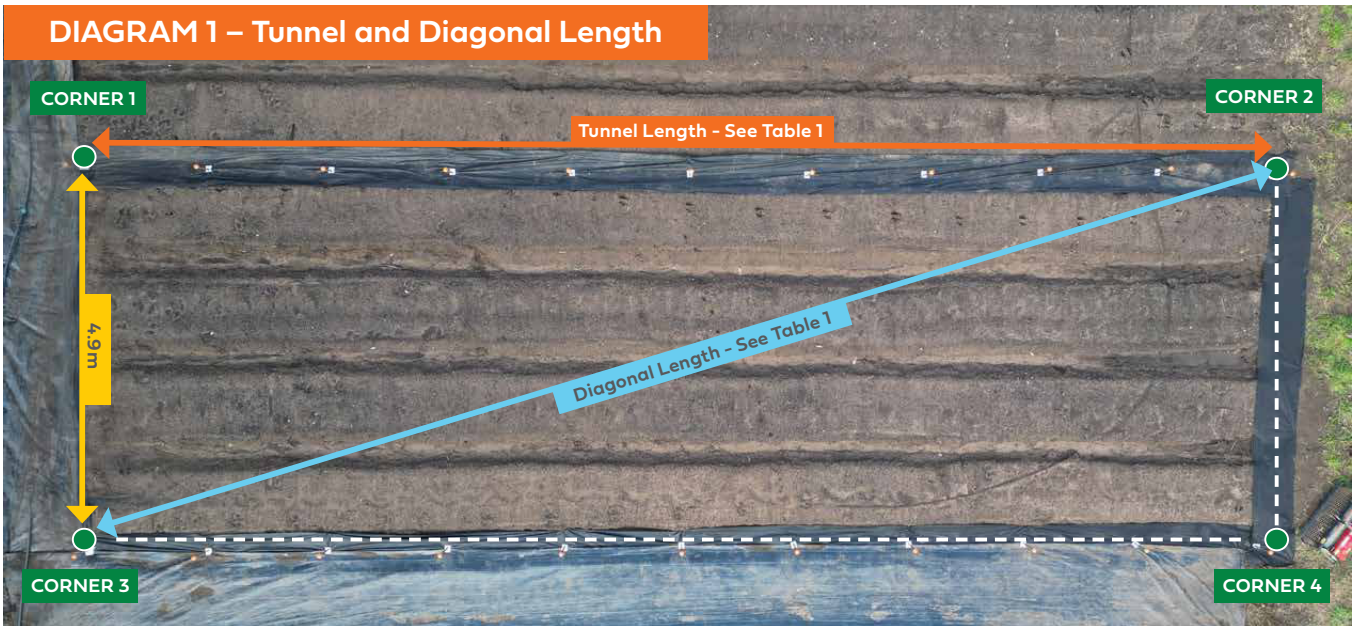


TABLE 1A – Hoop Spacings *(Inc Adjustments if Length Option Added)*

No. of Hoops	Tunnel Length	Hoop Spacing Without Purlin Brace Kit Option	Hoop Spacing With Purlin Brace Kit
6	7.5m	1500mm	1500mm
8	10m	1428mm	Hoop 1–2 (both ends) 1500mm spacing, then 1400mm all other spacing
8	(10.5m)	1500mm	1500mm
15	20m	1428mm	Hoop 1–2 (both ends) 1500mm spacing, then 1416mm all other spacing
15	(21m)	1500mm	1500mm
18	25m	1470mm	Hoop 1–2 (both ends) 1500mm spacing, then 1466mm all other spacing
18	(25.5m)	1500mm	1500mm
21	30m	1500mm	1500mm
28	40m	1481mm	Hoop 1–2 (both ends) 1500mm spacing, then 1480mm all other spacing
28	(40.5m)	1500mm	1500mm

TABLE 1B – Diagonal Measurements *(Inc Adjustments if Length Option Added)*

No. of Hoops	Tunnel Length Corners 1–2	Diagonal, Corners 2–3 (4.9m Width)
6	7.5m	8,959mm
8	10m / (10.5m)	11,139mm (11,587mm)
11	15m	15,780mm
15	20m / (21m)	20,592mm (21,564mm)
18	25m / (25.5m)	25,476mm (25,967mm)
21	30m	30,398mm
28	40m / (40.5m)	40,299mm (40,795mm)

STEP 1

Footing Rod Installation

Parts Required: G H

Step 1A

Locate one corner tunnel position* and drive one of the **Star-Lock Kit N18 (18mm wide) Footing Rods (G)** into **Corner 1***. Leave approximately *350mm* of **Rod (G)** above ground level. Measure the tunnel length, insert another **N18 Footing Rod (G)** into **Corner 2***.

Attach a string line from **Corner 1*** to **Corner 2*** at ground level. Drive in **N16 Footing Rods (H)** *every 1.5m* along the string (or as required - *See Table 2*), measuring every next position from **Corner 1*** to avoid error creep.

Tool suggestions for driving in footing rods include,
A - Manual post rammer, **B** - Sledge hammer or
C - Motorised post rammer *(see image: Step 1A - Suggested Tools).*

Note:

If using 75cm beds, 45cm paths (1.2m centres) format: 4.9m width: corner position is *5cm further out* from mid path before bed 1 and *5cm after* mid path beyond bed 4.

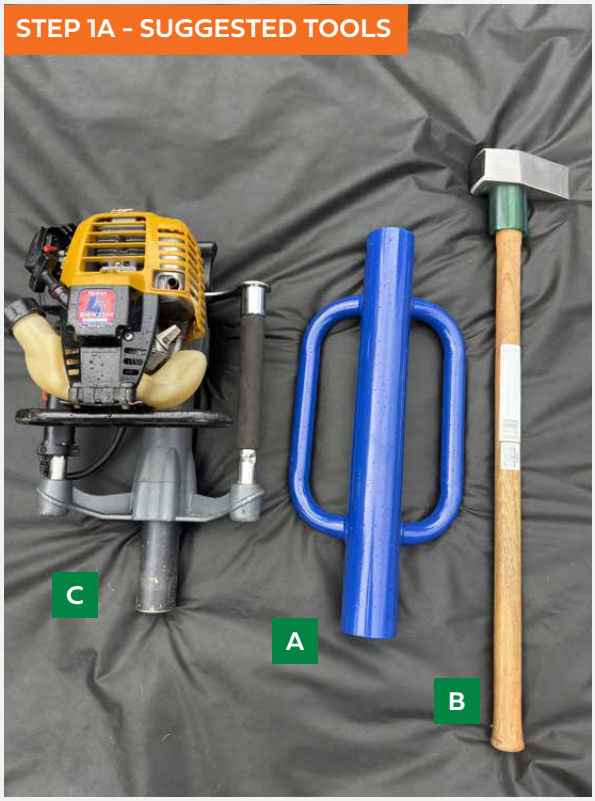
Step 1B

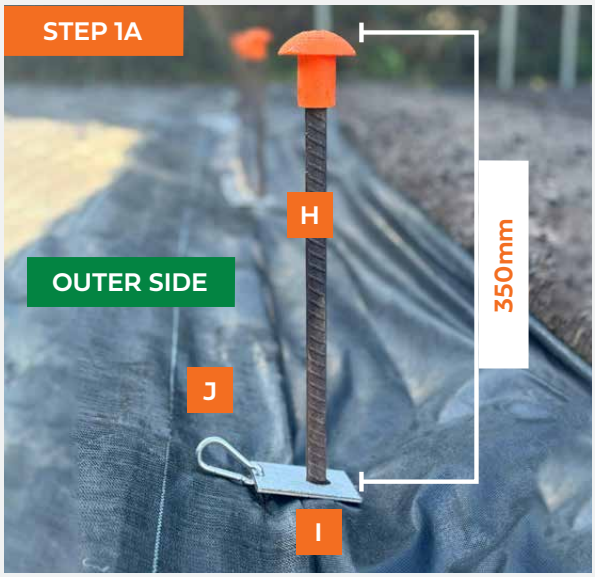
Measure *4.9 metres* from **Corner 1*** to the **Corner 3*** area and for accuracy measure the corresponding diagonal distance from **Corner 2*** *shown in Table 1*. Position **Corner 3*** where the 4.9m and diagonal measurements *intersect*.

Step 1C

Measure the tunnel length distance from **Corner 3*** to the **Corner 4*** area. Measure *4.9 metres* from **Corner 2*** to **Corner 4*** and position the last **Footing Rod (G)** where the tunnel length and width points *intersect*. Drive the remaining **Side Footing Rod (H)** between **Corners 3* and 4*** as described in Step 1A.

*SEE SPECIAL NOTE 1 & 2 ON PAGE 34





STEP 2

Anchor Plate & Carabiner

Assembly & Installation

Parts Required:	D2	D3	I	J	K	U1,2,3

Step 2A – Star-Lock Anchor Plate Guide

Position the **Star-Lock Anchor Plates (D2, D3)** over the 4 corner **Footing Rods** with the corresponding initials facing the end position. Front **Left/Rear Right** (**D2**) and **Front Right/Rear Left** (**D3**) *(see Diagram: 2).*

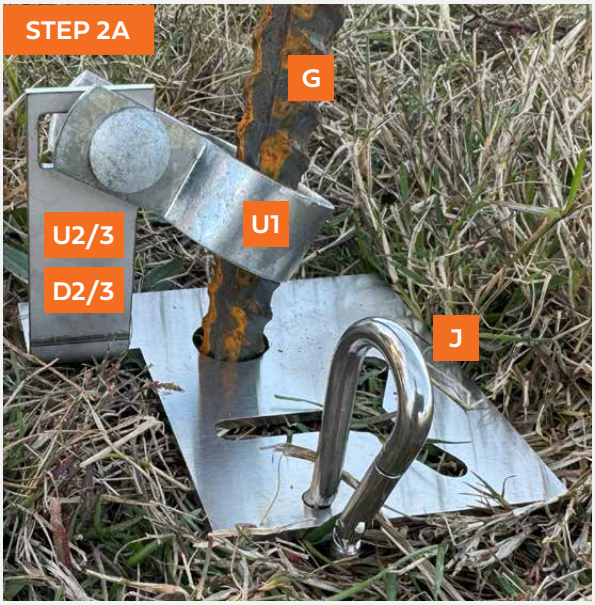
Loosely attach a **Brace Band (U1)** to each of the **4 x Star-Lock Anchor Plates**, using the **Bolt (U2)** and **Nut (U1),** with the hole for the **Short Bolt (K)** facing inwards *(see image: Step 2A)*

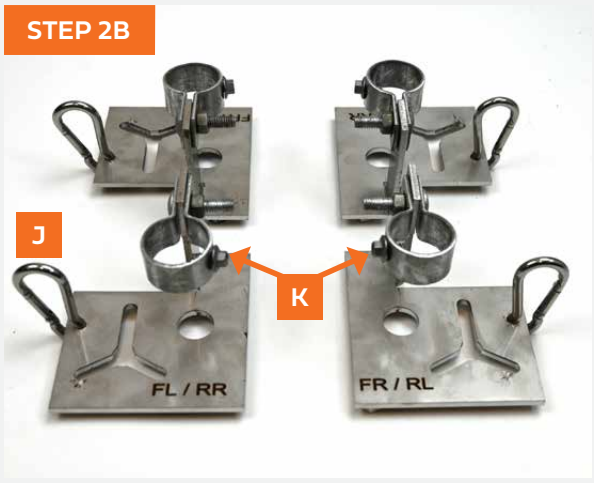
Note:
Do not insert Short Bolt at this stage.
Star picket added at later stage.

Attach a **Carabiner (J)** through the small plate hole with the latch facing outwards.

Step 2B – Standard Anchor Plate Guide

Attach a **Carabiner (J)** to each of the **Standard Anchor Plates (I)** with the *latch facing outwards*. Position the Standard Anchor Plates (I) over the footing rods with **Carabiners (J)** facing away from the inner tunnel *(see Diagram 2 on following page).*





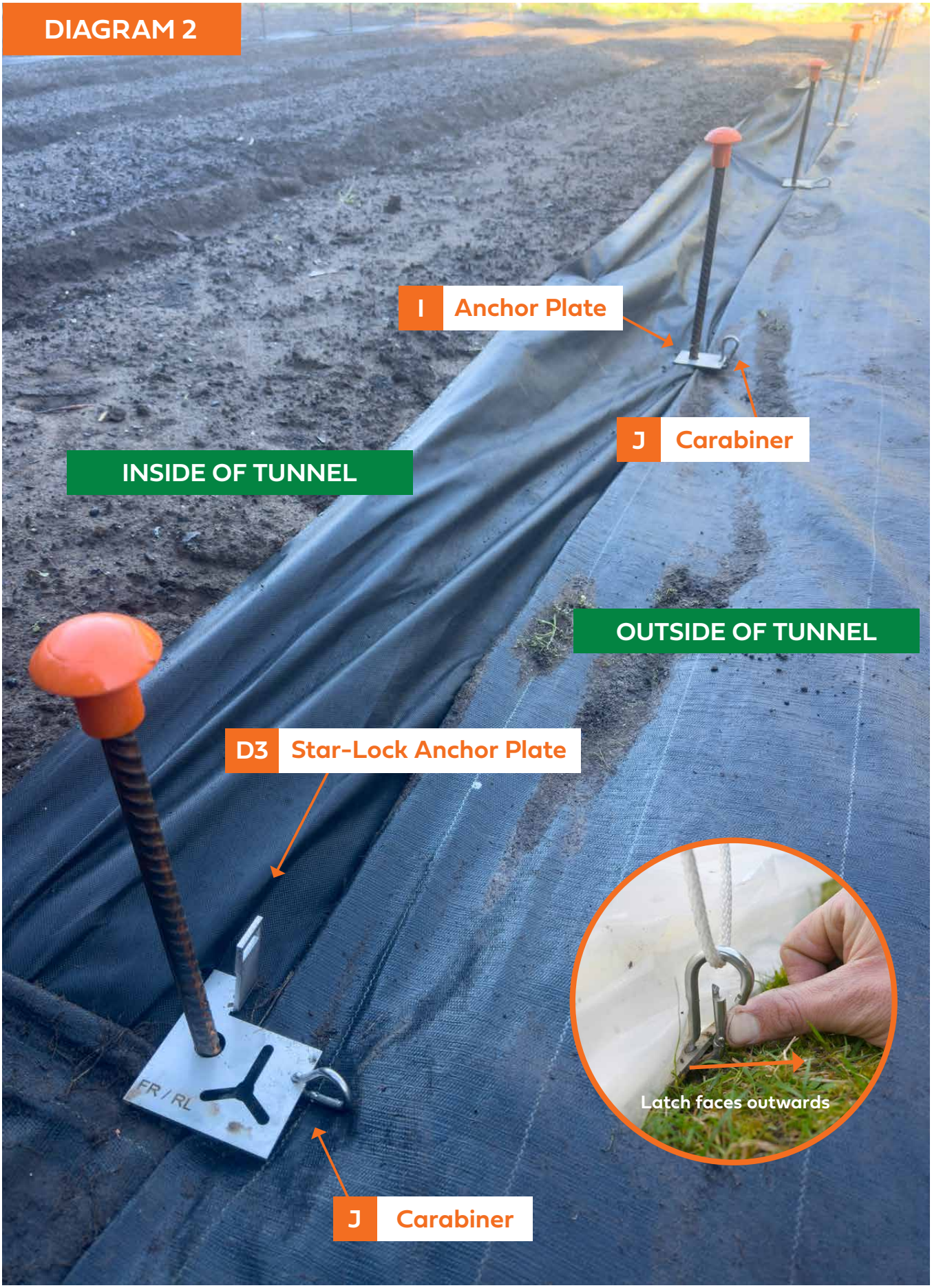


DIAGRAM 2
I Anchor Plate
J Carabiner
INSIDE OF TUNNEL
OUTSIDE OF TUNNEL
D3 Star-Lock Anchor Plate
FR / RL
Latch faces outwards
J Carabiner

STEP 3

Hoop and Lift Kit Sections

Prefitting & Assembly

Including Brace Bands and Side Curtain Hooks

Parts Required:	A1	A2	B	P	L	U1

Note:

It is important to join the **Hoop Sections (A1/B)** and the **Lift Kit Sections (A2)** *(see comment on Step 3B)* on a flat surface to avoid warps in the hoop.

Read Steps 3C and 3D prior to assembling hoop.

Step 3A

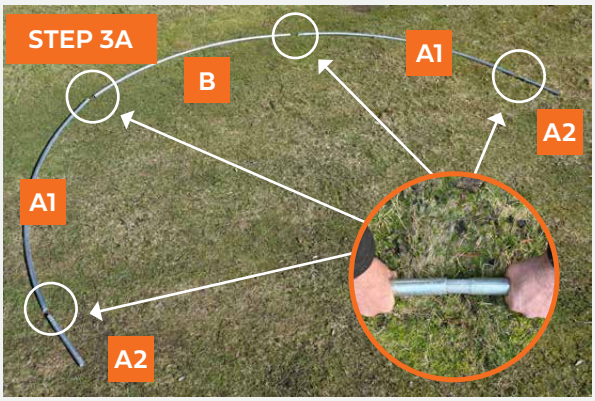
First attach the **Side Hoop Sections (A1)** to the Central unswaged **Hoop Section (B)**. Next attach the **Lift Kit Sections (A2)** to the base of the **Side Hoop Sections (A1)**.

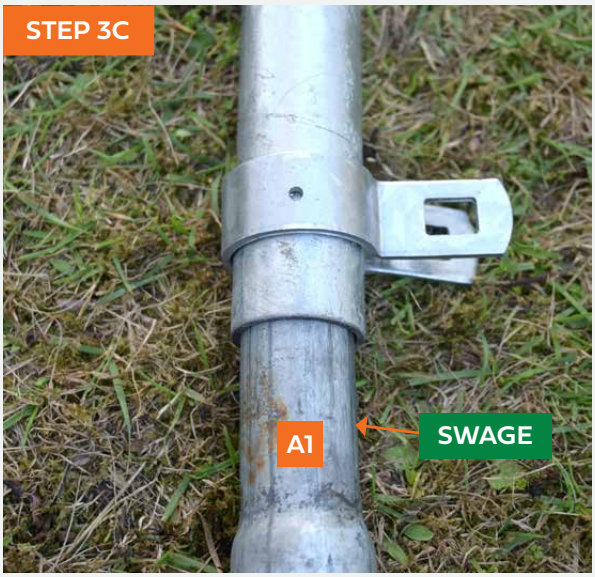
All **Hoop components (A1, A2, B)** are joined by placing the swaged end of the section into the reciprocating unswaged piece.

Slide the two pieces together the whole way leaving no additional space at the end of the swage. Tapping the side of the tube can assist in this process. If required, have a 2nd person slightly rotate the other end of the hoop while you push together. This tight fit provides strength against long term vibration from winds affecting the **Joining Screws (L)** ***(see image: Step 3A/B).*** If there is a faulty edge on the non swaged end it can be removed by cutting the last few millimeters off the tube.

Step 3B

Add 2 x **14g Hex Head Screws (L)** to the join from the overhead position approximately 40mm apart. The first should be set back about 10-15mm from the steel join, ensuring both are going through the joined **Hoop Sections (A1, A2, B - for lift section)** ***(see image: Step 3A/B).***





Step 3C – Fit Brace Bands to Hoops

This step applies for Wind Bracing and options; Cross Bracing, Purlin Bracing, Sliding Door Header Pole, Single Zip End Wall, Hoop-Side Bracing, and Trellis Cable Kit.

Brace Bands (U) are used to join **Bracing Poles** to **Hoops**. Preattaching brace bands makes the job easier ***(see image: Step 3C).*** Ensure Screw hole position is facing inwards away from film for when hoop is positioned.

There are two **Brace Bands (U)** used for every **bracing pole**. Add **Brace Bands** to the **Side Hoop** Sections of your hoops as shown on **Table 2.**

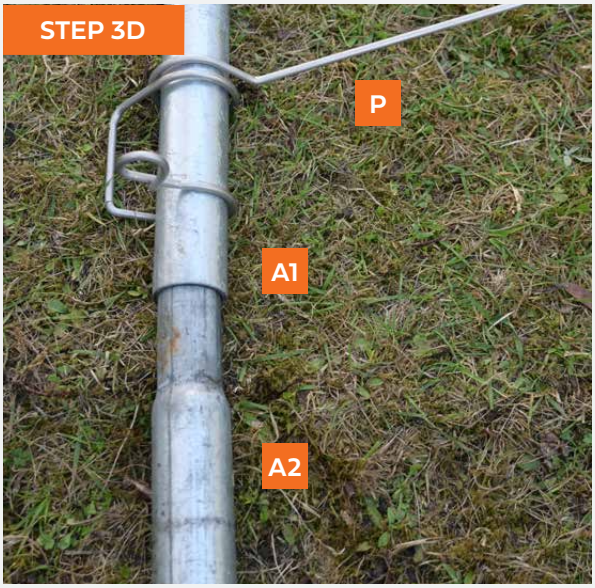
Step 3D - Adding Side Curtain Hooks

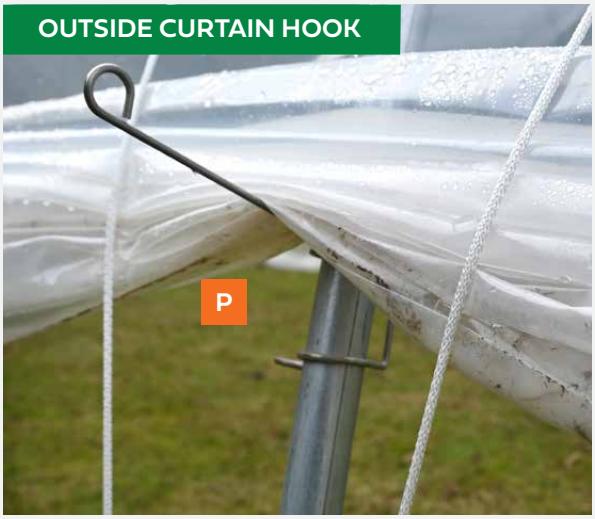
Add **Side Curtain Hooks (P)** to your preferred hoops by sliding onto the base of the **Side Hoop Section (A1),** above **Lift Kit (A2)** *(see image: Step 3D)*.

See Table 4 on following page, for suggested Side Curtain Hook placement for the length of your tunnel.

When placing Side Curtain Hook, please ensure it is the correct way up, with the greenhouse film **supporting arm** at the top ***(see images: outside/inside curtain hook placement).***

When tunnel is in use the Side Curtain Hook easily rotates to bring the film holding arm to the inside position, allowing the film to be lowered. To release and rotate the hook arm to the inwards position push the base of the Side Curtain Hook outwards ***(see image: Inner Curtain Position).***





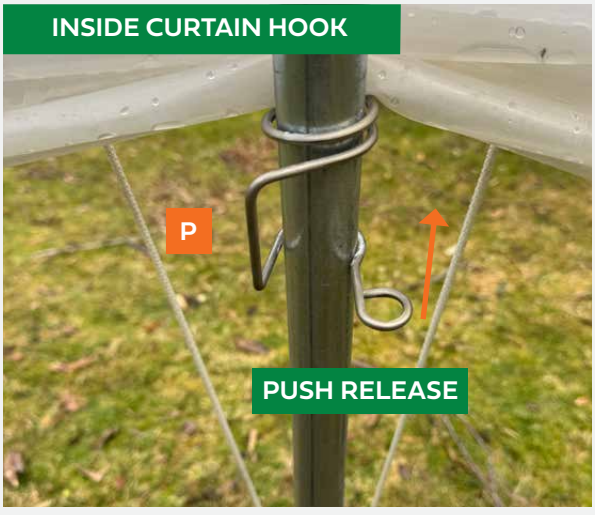


Table 2 - Prefitting Brace Bands Guide

Prefitting Brace Bands Guide | Cocoon Variants

Caterpillar Tunnel Configuration	No. Brace Bands 1st Hoop (Tunnel Ends)	2nd Hoop	3rd Hoop	All Other Hoops
Cocoon Pro Variants	2 x Brace Bands (1 each side)	4 x Brace Bands (2 each side)	2 x Brace Bands (1 each side)	NIL
Cocoon Pro Variants w/ Cross Bracing (Every Pole)	4 x Brace Bands (2 each side)	6 x Brace Bands (3 each side)	4 x Brace Bands (2 each side)	2 x Brace Bands (1 each side)
Cocoon Pro Variants w/ Purlin Brace + Cross Bracing (Every Pole)	6 x Brace Bands (3 each side)	8 x Brace Bands (4 each side)	4 x Brace Bands (2 each side)	2 x Brace Bands (1 each side)
Trellis Cable Kits Attached To End Hoops *(Not Attached To Header/Cross Bracing Pole)*	Add 1 Brace Band Per Cable			

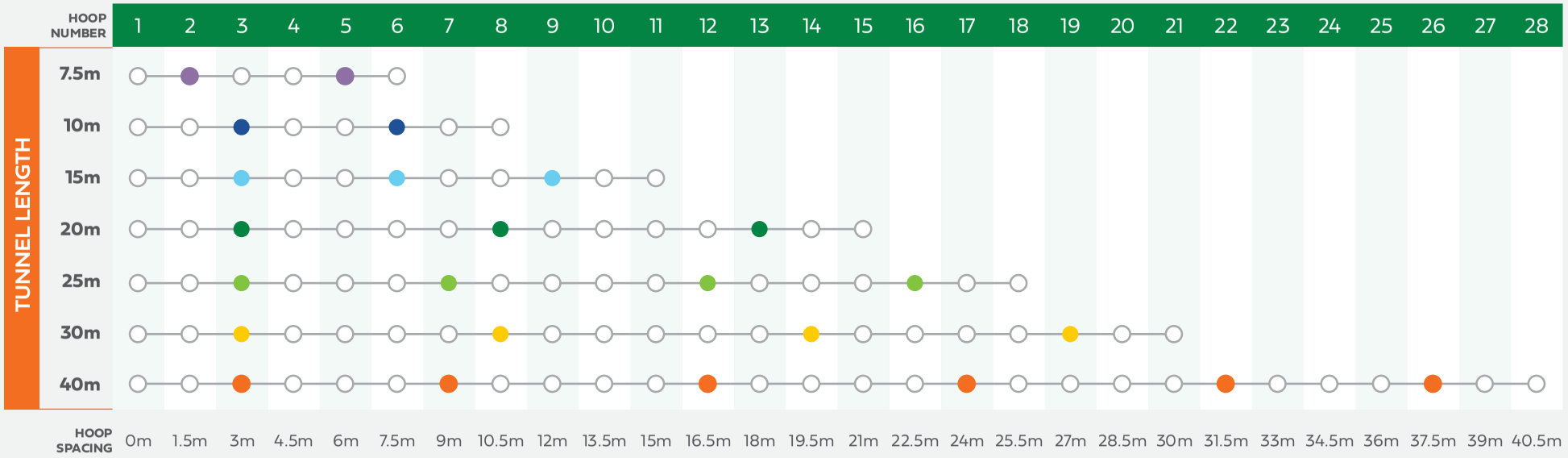
*2nd Wind Bracing Kit

Caterpillar Tunnel Configuration - *2nd Wind Bracing Kit	Central Hoop	*Hoop Either Side Of Central Hoop	*2nd Hoop Either Side Of Centre
Cocoon Pro Variants	4 x Brace Bands (2 each side)	4 x Brace Bands (2 each side)	2 x Brace Bands (1 each side)
Cocoon Pro Variants w/ Cross Bracing (Every Pole)	6 x Brace Bands (3 each side)	6 x Brace Bands (3 each side)	4 x Brace Bands (2 each side)

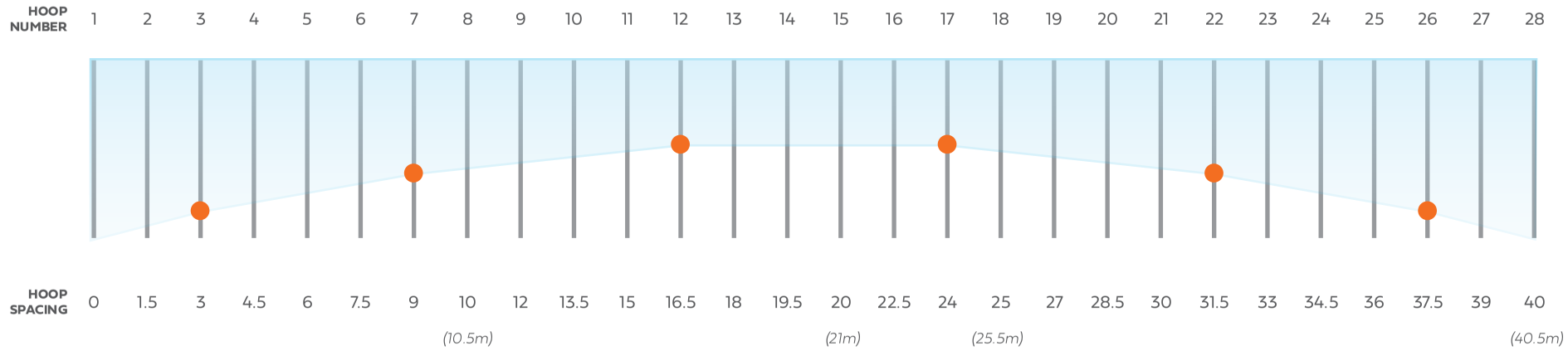
**2nd (Central) Wind Bracing Kit Option - Included With 40m Variants.*

Table 3 - Side Curtain Hook Placement – 1.5m Hoop Spacing

Coloured circles indicate hoops with side curtain hooks.



40M TUNNEL EXAMPLE



STEP 4

Cross Bracing Option Installation

The optional add-on, Cross Bracing Trellis Poles can be installed either before hoops are positioned on Footing Rods or after. Cross Bracing on End hoops should be added before Locking Channel in order to adjust for level position.

Parts Required: U1 U2 U3

Step 4A

Ensure that the **Cross Bracing Brace Bands (U1)** are added to your required hoops. For easier adjustment, position about 10cm above the join on the **Side Hoop (A1)**.

Note: Final bracing pole position will differ according to minor adjustments in tunnel width or ground level variations on the site.

Method 1 - Attaching Cross Bracing Poles before positioning Hoops on Footing Rods.

Attach one end of the **Bracing Pole** to the **Brace Band.** For end hoops, face bolt thread and nut inwards to avoid damage to film.

TIP: If **Hoop** is too wide, put one side against a stable edge e.g footing rod and push the other **Side Hoop** inwards until the **Bracing Pole** meets the **Brace Band** *(see image: Method 1).* Secure without tightening to allow leveling after hoop is positioned.

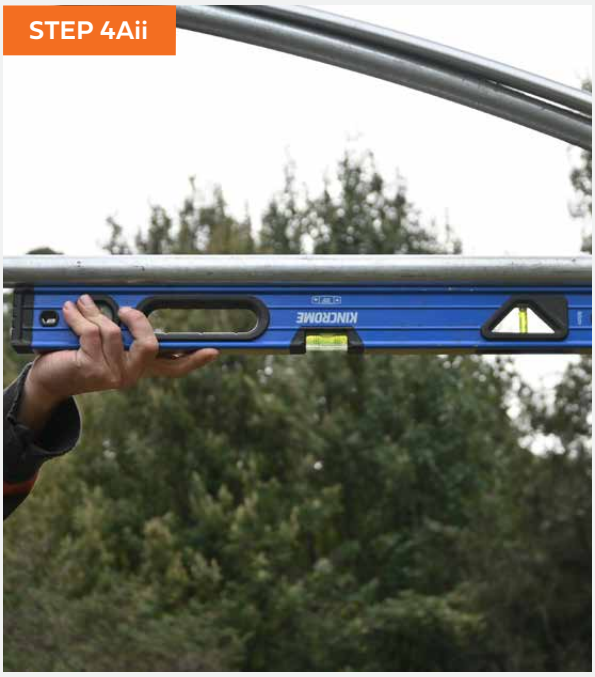
Method 2 - Attaching after positioning Hoops on Footing Rods.

For both methods, 1 and 2, use a spirit level to check before tightening **Bolt** and **Nut**. **Secure Brace Band** to **Hoop** with **14g Screw** *(see image: 4Aiii).*

Note: In some instances the Brace Band may coincide with the position of one of the two swage screws , when this occurs include the Brace Band on the swage using the swage connecting screw.

Step 4B

Repeat for all **Cross Bracing Trellis Poles.**



STEP 5
Hoop Installation

Parts Required: K L

Step 5A

1st Hoop: Place Hoops on **Footing Rods** starting from furthest hoop to enable work flow *(see image Step 5A)*. Ensure that the first and last hoops are the correct way around so that **Screws (L)** face *inwards*, to avoid damage to greenhouse film.

Step 5B

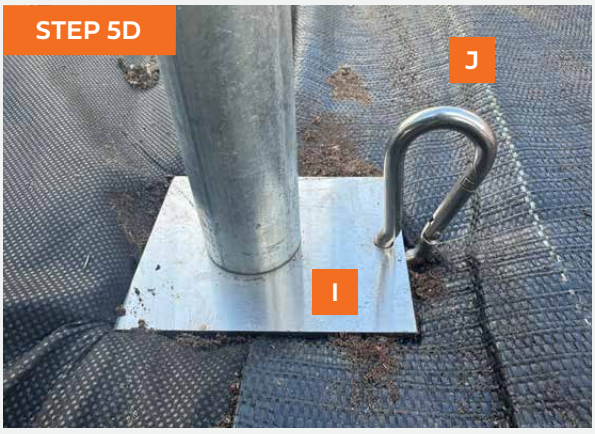
To place hoop on the footing rods: rest one hoop side just on the top of the **Footing Rod** while the other hoop side is flexed slightly and positioned over the **Footing Rod**. Move both hoop sides down together, *incrementally*.

Step 5C

Slide each side of the first hoops through the **Brace Band (U1)** attached to the **Star-Lock Anchor Plate (D2/D3)**, make sure it is all the way down and tighten the **Brace Brand Bolt (U2)** and **Nut (U3).** Apply a **14g Screw (L)** through the hole on the **Brace Band (U1)** into the **Hoop** wall and then remove the **14g Screw**. Replace with the **Short Bolt (K)** *(see image: Step 5C, and also Short Bolt method used in images for Step 6i and 6ii on following page).*

Step 5D

Add remaining hoops ensuring full contact with the **Standard Anchor Plates (I)** *(see image: Step 5D).*



STEP 6

Wind Bracing
First End Installation

Parts Required: K | L | U1 | U2 | U3 | V

Notes:

1. Retrofitting **Brace Bands (U1)**. If required, open out brace bands slightly with 2 sets of pliers or open ended spanners and push onto hoop. Ensure screw hole in brace band is facing inner tunnel and then use pliers to close up brace band ***(see image: Opening Brace Band).***
2. Tunnels have wind bracing positioned at both ends, with two diagonal brace poles running from the 1st hoop through to the 3rd hoops on both tunnel sides. Tunnels over 30m may have an additional set of bracing around the central hoop position of the tunnel (like two tunnels butted up together).

Below are the instructions for forming the 2 x Brace - corner sections. This process is then applied to each corner and to the central hoop section for tunnels with additional wind bracing.

OPENING BRACE BAND - PLIERS

OPENING BRACE BAND - WRENCH

2 BRACE CORNER

Step 6A

Attach **Brace Band (U1)** to the base of **Hoop 3** using Short Bolt Method*.

Note: Required due to internal footing rod ***(see images 6A.i and 6A.ii).***

Attach end of **Wind Bracing Pole (V)** to **Brace Band (U1)** using the **Galvanised Bolt (U2)** and **Nut (U3)**. Ensure bolt thread and nut are facing the inner tunnel.

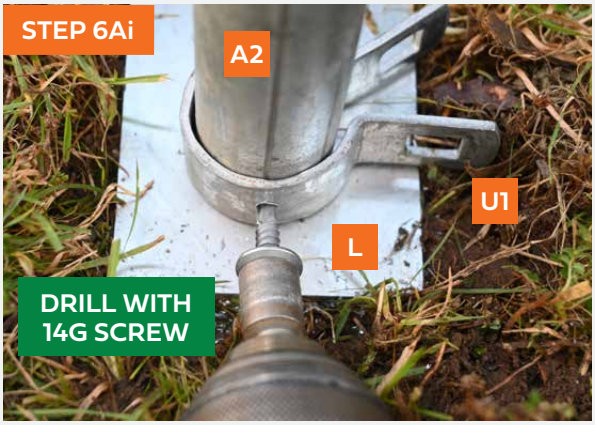
Step 6B

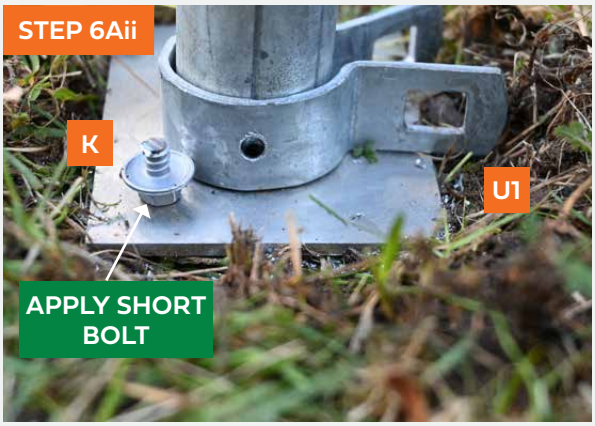
Leave the **Wind Bracing Pole (V)** laying flat and semi-tighten nut. Check that **Hoop 3** is roughly plumb and lift the **Wind Bracing Pole (V)** up to the lower **Brace Band (U1)** on **Hoop 2.**

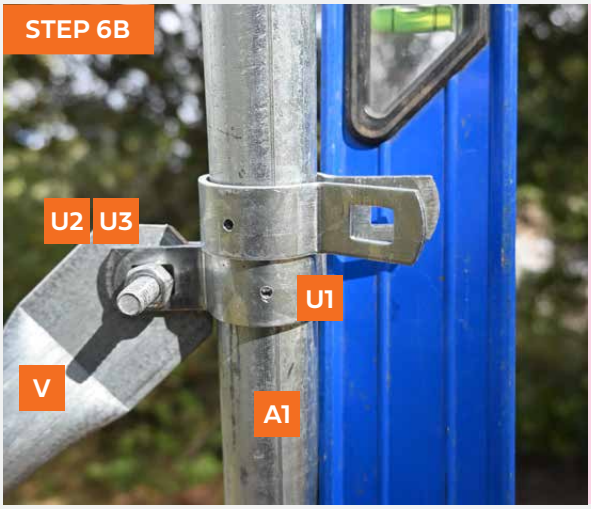
Loosely attach with the **Galvanised Bolt (U2)** and **Nut (U3)** *(see image: 6B).*

Step 6C

Adjust plumb level of **Hoop 2** by raising or lowering the lower **Brace Band (U1)** on **Hoop 2**. When plumb attach **Brace Band (U1)** to Hoop with **14g Screw (L)** *(see image: 6C).*







Step 6D

Attach upper **Brace Band (U1)** to **2nd Hoop** directly above the lower **Brace Band (U1)** directing it towards the **End Hoop** and tighten the **Bolt (U2)** and **Nut (U3).**

Secure upper **Brace Band (U1)** with a **14g Screw (L)** and attach **Wind Bracing Pole (V)** between **Hoop 2** and **Hoop 1** *(See image: 6D.i)*

Check **Hoop 1 (End Hoop)** is plumb level and secure with **14g Screw (L)**. *(See image: 6D.ii)*

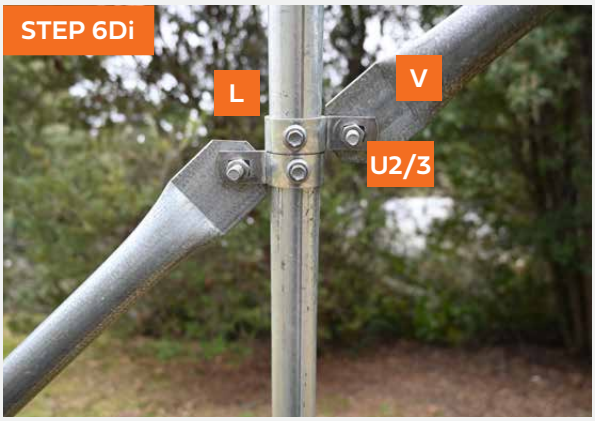
Step 6E

Go back and check that all **Brace Band Bolts (U2)** and **Nuts (U3)** are sufficiently tightened.

Step 6F

Repeat at other side of same tunnel end.

Note: Wind Bracing is attached to other tunnel end after attaching Centre Purlin (after Step 8D).



STEP 7

Centre Purlin Assembly

Parts Required: E1 E2 L

Note

For ease of fitting, consider attaching the Cente Purlin in 5 metre (2 x 2.5m) sections.

Step 7A

Join **Centre Purlin (E1)** Sections on the ground. Attach at swage joins with 2 x **14g Screws (L)** as per hoop assembly. Ensure joins don't leave gaps and screws are all facing the same direction.

All **2.5m Purlin Sections (E1)** have a swaged end, cut the last end swage off before fitting as this is not required.

Note: If your tunnel length provides two possible lengths, e.g. 10m (10.5m) then you will be supplied with 10m of **2.5m Purlin Section (E1)** plus 1 x **Optional Purlin Section (E5)**.

In this scenario leave the additional length until Centre Purlin is in position before cutting the excess.

Step 7B

Make a mark at every hoop intersection point so that they can be seen when joining Hoops to **Centre Purlin** with the **Cross Connectors (E2)** *(See Table 3: Hoop Spacing Table, Pg 16).*

*SEE PAGE 16 FOR HOOP SPACING TABLE

STEP 8

Centre Purlin Installation

Parts Required: E2 E3 E4 L

Step 8A

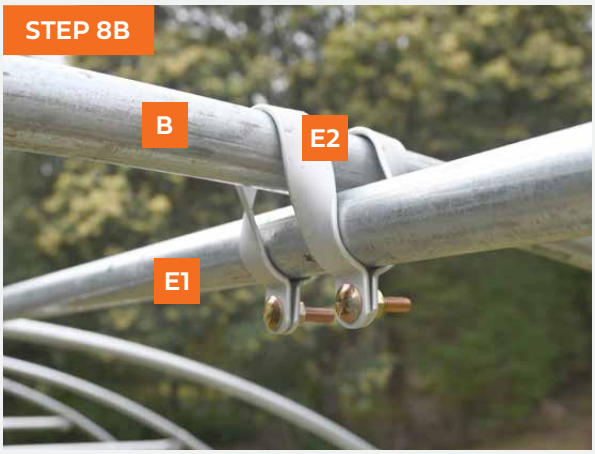
Position the **Cross Connector Pair (E2)** at the apex of the hoop on every hoop leaving them loose enough to slide the **Purlin** through. Slide the **Purlin** through two of the loose **Cross Connectors (E2)**. Ideally this is a 2 person and 2 ladder task.

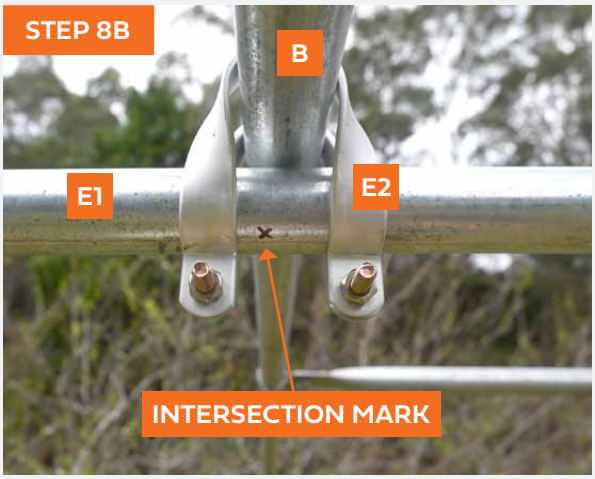
Note: If you have installed **Cross Bracing Poles** the sections of **Purlin** can rest on top of the **Bracing Poles** while you slide one end through a **Cross Connector (E2).**

Step 8B

First, check that the two **Cross Connectors (E2)** are *centred on the hoops*, next then line up the mark on the **Centre Purlin** with the intersecting centre point of the **Hoop** *(See lower image: Step 8B).*

All **14g Screw** heads on the **Centre Purlin** swage joins should be facing downwards or to the side. Tighten the two **Cross Connector Bolts** with (ideally) a deep 14mm socket or spanner.





Step 8C

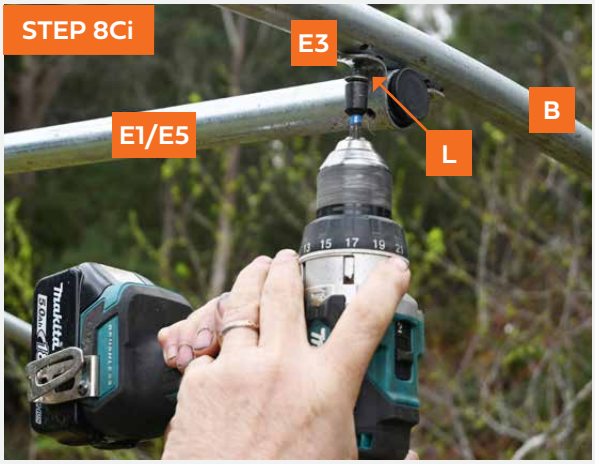
Purlin-End Saddle Note: Safety Goggles are **REQUIRED**.

Note: The end of the **Centre Purlin** should be flush with the outer edge of the end hoop. Any excess **Purlin** should be removed after attaching the **Purlin-End Saddle (E3).**

Attach the **Purlin-End Saddle (E3)** loosely with the **14g Screws (L)** to the underside of the end hoop apex, ensure the **Centre Pulin** is positioned flush with the outer hoop edge and tighten the **14g Screws (L)** going into the hoop. Place the remaining 2 x **14g Screws (L)** through the **Purlin-End Saddle (E3)** holes and into the **Purlin** *(see image: 8Ci and 8Cii)*.

Step D

Add the plastic **Purlin-End Caps (E4)** to the ends of the **Centre Purlin** by taping in gently with a hammer, they do not require any adhesive.



STEP 9

End-Hoop Purlin Brace Option Installation

Parts Required:	L	U1	U2	U3

Notes:

1. **End-Hoop Purlin Brace** greatly reduces end-on wind stress (on the **Centre Purlin**) and is recommended in the following scenarios;
   1. When end walls are fitted
   2. When Trellis wires are attached and crop bearing weight is expected to be high on multiple wires.

2. If fitting **End-Hoop Purlin Brace** to a tunnel using the extended length option first check **Hoop Spacing** requirements for all other hoop spaces. *See TABLE 2A.*

Step 9A

Position 2 x **Brace Bands (U1)** on the end hoop, 50cm either side of the Centre Purlin position, with bolt holes directed towards the 2nd hoops. Ensure predrilled hole in **Brace Band (U1)** is facing downwards, away from film and locking channel positions ***(see image: Step 9A).***

Step 9B

Repeat process on the 2nd hoop but with the **Brace Band** holes directed towards the first hoop.

Step 9C

Attach **Purlin Brace Poles** to **Brace Bands (U1)**, ensure **Bolts (U2)** are facing downwards with **Nuts (U3)** on the underside to protect film from puncture. Securely tighten bolts. ***(see image: Step 9C).***

Step 9D

Repeat at other tunnel end.

STEP 10

End-Hoop Lock Channel Installation

Parts Required: O Q R

Note:

Locking Channel (Q) is designed to secure horticultural fabrics to frames by locking them into place with an insert wire (Wiggle Wire). The Aluminum Locking Channel that we have provided for the end hoops is able to fit two layers of material and wires. This will enable you to add; 1. The tunnel film and 2. One of the following; end wall film, shade cloth, insect cloth.

Tip: Ensure all required Brace Bands and other fittings such as U-Brackets for End walls are positioned prior to attaching Lock Channel.

Step 10A

Position the **Locking Channel (Q)** on the outer edge of the end hoop starting at the base. The **Locking Channel (Q)** will easily conform to the curvature of the outer edge.

Attach the first **12g Self Driving Screw (R)** within 10cm of the base of the hoop and channel. ***(see image: Step 10Ai)***.

Apply more **12g Screws (R)** every 35-45cm up the channel and about 2-3cm from the end. ***(see images: Step 10Aii and Step 10Aiii).***

Note 1: It can be helpful to use a rope or belt to pull the end of the length of channel in to the hoop.

Note 2: Recenter the **Locking Channel (Q)** every time before drilling to keep it central on the hoop and to make neat joins ***(see images: Note 2i and Note 2ii).***

Step 10B

Continue attaching **Channel** over the hoop and measure the last piece, cutting it shorter to make it fit. Cover each join with a small piece of the **Film Repair Tape (O)** to protect the **Greenhouse Film (F)** while covering.

STEP 11

Star-Lock Anchoring System

Installing Star Pickets

Parts Required: D1 N

Step 11A

Apply the **900mm Star Picket (D1)** to the Y shaped slot on the **Star-Lock Anchor Plate (D2-D3)**, angled at about 45 degrees toward the centre of the tunnel's side ***(see image: Step 11A).***

Step 11B

Use a hammering device ***(image 11B uses an upside down post rammer)*** to penetrate the soil, leaving about 10cm out of the ground ***(see image: Step 11B).***

Note: Wearing noise protection is advised.

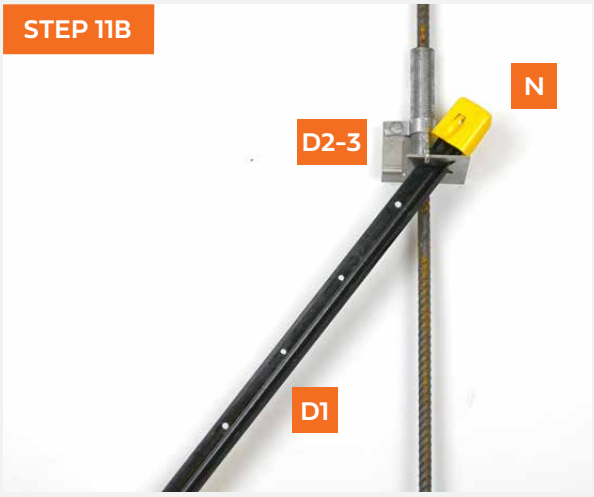
Step 11C

Place the provided **Yellow Safety Cap (N)** securely over the end of the **Star Picket (D1)**.

Step 11D

Repeat process on remaining 3 corners.

Image 11B shows the above and below ground positioning.



STEP 12

Greenhouse Film Prep and Unfurling

Parts Required: F

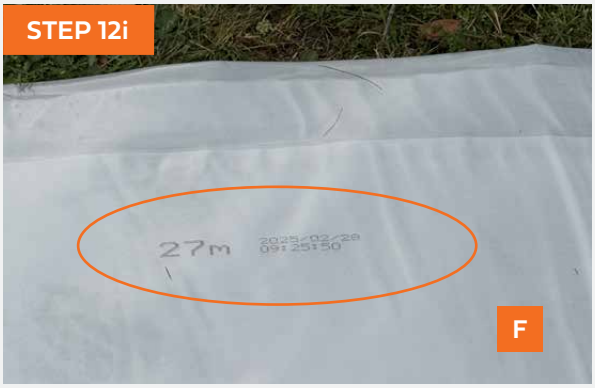
Notes:

- Only attempt if there is **NO BREEZE**. Ensure there are sufficient people for the job:
  - Tunnel to 15m - 2-4 people (ideally 4)
  - Tunnel to 30m - 3-5 people (ideally 5)
  - Tunnel to 40m - 4-8 people (ideally 6+)
- To avoid film damage take care to not scuff or rub the ends of the roll as it will damage the length of the roll.
- **UV protection and side facing inwards.** Before lifting over the tunnel, check that the printed logo or metre numbers can be read the correct way.
- Ensure film is facing the way directed by the printed message on the film, e.g. ***'Outwards Facing'*** or ***'Inside'***. If the film provided is branded ActiveVista the writing will be on the outside of the film. If the film is otherwise branded the writing may be readable on the inside of the film, in this situation face film in the direction noted on the film. This is required for the UV treatment to work. Failure to do so will lead to short film life ***(see images: Step 12i, Step 12ii, Step 12iii).***
- Before unrolling the film, consider positioning a ladder in the centre of the tunnel.
- Place one length of wiggle wire in an accessible position at each corner of the tunnel, this will help if wind picks up and rapid fixing is required.

Step 12A – Position and unroll the film

There are various ways to unroll the **Film (F):**

- **1 - Stationary roll:** Place a long handle through the roll's cardboard centre and position between two ladders or similar. This will allow opening out without impacting on the ground
- **2 - Rolling on the ground:** Place weights on the start of the unrolled film and roll out alongside the tunnel, check for debris or sharp/rough objects along the way.



Step 12B - Cutting Excess Film Length

Method 1. Position the **Roll (F)** alongside the tunnel leaving a small amount past the end **Hoop**. After rolling the **Film (F)** out you will have 7-10m of spare film that can be used for end walls. Leave about 30cm of additional film at either end (10-15cm will still be sufficient if absolutely required). To remove the excess/end wall film, use a good pair of office or flower scissors (not snips). Cut through all layers in a single pass. If the film has a centre fold, cut from either side to the centre.

Method 2. If you are unsure about cutting the **Film (F)** at this stage, leave equal amounts at either end and cut after fitting the film. Each off-cut will be sufficient to cover an End Wall including doors.

Step 12C - Opening Film and Covering Tunnel

Prepare the **Film (F)** for opening. Tie a small ball sized object in the corner of the **Film (F)** with builders string or thin rope and leave a 8-10m length of rope coming off (see notes, Step 12 to select correct side for tunnel).

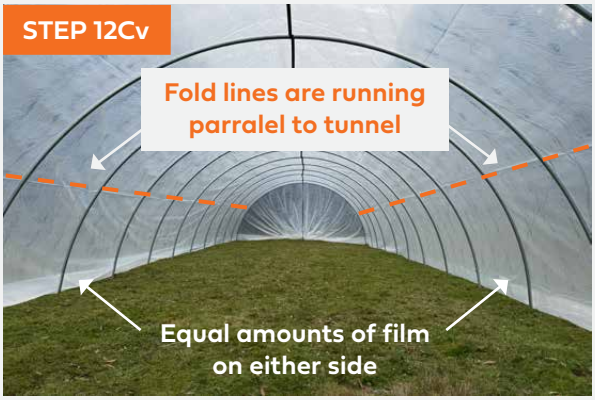
For film lengths over 20m consider adding an additional ball and rope on the side's centre ***(see image: Step 12Ci).***

Lift the two selected corners (and centre) using the rope.

Holding the rope securely, start lifting over the tunnel. People at the end positions can use the attached ropes to aid movement of the film over the tunnel while the central person (and others) can help to unfurl the layers and lift the **Film (F)** up, across the side of the tunnel from the inside position ***(see images: Step 12Cii, iii and iv).***

Pull the **Film (F)** all the way across and while maintaining grip on each corner and make sure that:

1. Equal amounts of **Film (F)** are at each end of the tunnel (distance past star pickets)
2. Equal amounts of **Film (F)** are on either side of the tunnel
3. Ensure that the **Film's (F)** fold lines are running parallel to the tunnel ***(see image: Step 12C).***



STEP 13

Greenhouse Film

Securing Film to End Hoop

Parts Required: S

Step 13A

As soon as **Film (F)** is leveled out on the tunnel place temporary **Wiggle Wires (S)** in each corner and in the top centre. Applying 30cm of the 2m wire is sufficient. This will protect from wind disruption during fitting ***(see image: Step 13A).***

Step 13B

Starting at the top centre, apply the **Wiggle Wire (S)** into the Channel. Work your way down the side gently pulling the **Film (F)** downwards and towards you as you go ***(see images: Step 13Bi and Step 13Bii).***

Cut off any excess **Wiggle Wire (S)** past the base point with side cutters, snips or a cut-off wheel. Repeat from the top down the other side of the hoop.

Step 13C

Move to the other end of the tunnel. Start at the top centre, this time pull the **Film (F)** semi-taught and start applying **Wiggle Wire (S)** down either side of centre, ideally simultaneously (with a 2nd person, or move from side to side every 50cm or so) keeping the film taught and pulling on a downwards angle at the same time. Cutting off any excess wire at the base.

STEP 13A

STEP 13Bi

STEP 13Bii

STEP 14

Securing Tunnel with Anti-Billow Rope

Parts Required: C

Notes: *(See Diagram 3 page 31)*

1. It is quick and efficient for 2 people to carry out this step.
2. Two options are given, while both work very well, the 2nd is highly recommended.
3. If ropes are loose the film will billow out in high winds, this will lead to tunnel damage. Re-tensioning of new tunnels is recommended after ***2 weeks*** and then ***after 3 months.*** Check ***biannually*** or ***after weather events***.
4. To unroll rope spool, place a rod through the spool and rest each end on chairs, step ladders or similar.
5. Meter out rope ***before*** throwing over tunnel. About ***14-17 arm lengths*** of looped rope is sufficient to reach over the tunnel for the person's access on the other side ***(see image: Step 14 - Note 6).***
6. When tensioning ropes, pull hard enough to ***feel tightness*** in the film and ensure ***evenness*** of tension down the tunnel's length.

Step 14A – Option 1: Zig Zag

Two rope sections to cover the length of the tunnel. Suggested for use in protected areas and with shorter tunnels to 20m.

Step 14A.1

Attach **Rope (C)** to the **Carabiner (J)** at **Point 1** on the base of the **1st Hoop**. Throw across top and attach to **Point 2** on the other side ***(see images: Step 14A1i and 14A.1ii).***

Repeat this down the tunnel, each person skipping one hoop at a time as they go. Temporarily tie off the rope on the final **Carabiner (J)** position (**Point 3**).

Cut the **Rope (C)**.

STEP 14 - NOTE 5

STEP 14A.1i

STEP 14A.1ii

Step 14A.2

Start the opposite side, tying at the **Carabiner (J)** from the first hoop **(Point 5)**. Continue steps as before, tying off on the final **Carabiner (J)** at **Point 6**.

Step 14A.3

Tension the **Ropes (C)** - Starting at **Position 2**, pull down from the right hand side (closest to the start position). Next the person on the other side pulls down on the **Rope (C)** from their left hand side at **Point 3** (taking up the slack from **Point 2** *(see image: Step 14A.3ii).* Continue to the end position and make a tensioning knot *(see image: Step 14A.3iii).* Cut off excess **Rope (C)** and melt end of **Rope (C)** to prevent fraying.

Step 14A.4

Repeat process from **Position 4.**
(See Diagram 3 on following page - 33).

Step 14B – Option 2: 'V' Technique

Rope sections spanning 2 hoop spaces. Suggested for added security and risk reduction.

Step 14B.1

Attach **Rope (C)** to the **Carabiner (J)** at **Point 1** on the first hoop. Throw across top and attach to **Point 2** on the other side. Pass back to **Point 3,** secure to the **Carabiner (J)** and tension section of **Rope (C)** using a tensioning knot.

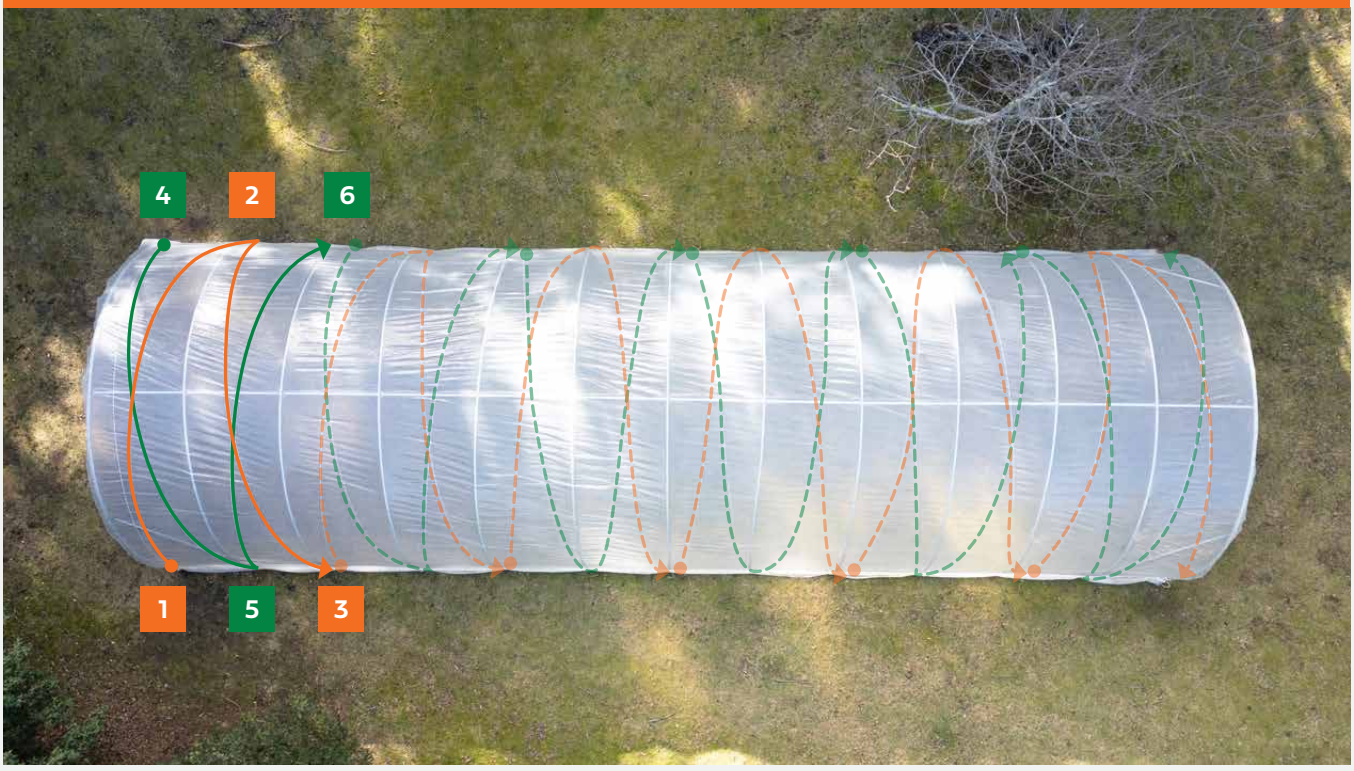
Cut **Rope (C)** and reattach at the same **Carabiner (J) (Point 3).** Repeat this down the tunnel, each person skipping one **Hoop** at a time as they go. Tie off the **Rope (C)** on the final **Carabiner (J)** position **(Point 4)** *(see image: Step 8B.1).*

Step 14B.2

Repeat the process from the opposite side of the tunnel starting at **Point 4** *(see Diagram 3B on following page).*

DIAGRAM 3A: ZIG ZAG METHOD

DIAGRAM 3B: 'V' TECHNIQUE



Special Notes

1. Bed Position Consideration

When locating corner tunnel position, consider bed placement.

Depending on tunnel access requirements you may want beds closer or further from tunnel walls. Additionally hoops can be set wider or narrower by +/- 10cm, if doing so recalculate accuracy of corner angles.

2. Adjusting Footing Rod Position

If footing rod strikes a rock, remove and try moving forward or back by 10cm. ***Do not*** measure hoop spacing from the new position. ***Always measure from corner.***

3. Side Curtain Hook Operation

3.1 Side Curtain Hooks can be raised or lowered as required for supporting film. When not required the hook can be turned to face inwards and the film will go back to ground level ***(see image: SN3i).***

3.2 Side Curtain Hooks can move past Hex head screws by spinning the side curtain hook with the hex head moving through it.

3.3 Occasionally a variation in hoop steel diameter will loosen the grip of the Side Curtain Hook. In this scenario place a hex head screw at the height you want to use the hook. You can then use as normal.

SN3i

SN3ii

4. Tunnel Relocation

The Caterpillar Tunnel series are designed for portability, with appreciation to regenerative methodology, crop rotation and season extension in mind.

4.1 Seasonal movement: If you are planning semi-regular tunnel movements it may be wise to invest in a 2nd or further set of footing rods. The footing rods can be set-up ready for transferring your tunnel and can also be positioned permanently for future moves. Just add Safety caps (not included) to the tops of the footing rods ***(see image SN4).***

4.2 Greenhouse Film and UV protection: Mark the inside side of your film before removing to ensure your film is facing the correct way when it is repositioned. This will avoid unnecessarily shortening its light transmission and usability.

4.3 Removing Footing Rods is easy with the assistance of a lever. A strap can be tied to a car jack hanging upside down from an A frame ladder for example. If you are often moving or would like to make it very easy try using a Jack Jaw post puller available from our online store.

SN4

ACTIVEVISTA

1690 Huon Road, Longley
Tasmania AUS 7150

Phone +61 427 995 867

www.activevista.com.au