

Freeform Trade Guide

Introduction

The concept of Freeform is to simplify the process of quoting and manufacturing bespoke tensile canopies and shade sails. This has been done by formulating a set of 5 simple parameters that the canopy must fall in to, but which allows enough flexibility to cover the vast majority of small to medium scale projects. The other key aspect to the concept is our universal angle corner systems, allowing us to cater for any corner angle with the same hardware, which simplifies the design process and keeps costs uniform.

We have also created a secure trade-only section on our website dedicated to the Freeform product, that gives you access to the following benefits –

- Downloadable pdf document library
- Free fabric sample ordering service
- Trade price on-line quote system
- 30 day credit terms
- Free phone/email support

The following document aims to deliver straight-talking information designed to help our trade customers fully understand the Freeform concept and how best to combine it with their end-user services.



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Parameters

- 1. Fabric** - You have the choice of six fabrics in the Freeform range; three shade fabrics and three waterproof fabrics. Whilst all six fabrics offer protection against UV radiation, heat and glare, the three shade fabrics are NOT waterproof and in fact allow water to drip directly through the weave. Whilst this is an obvious disadvantage compared to the waterproof fabrics, it does mean the canopy can be much flatter with less tension, so the structure as a whole generally works out much cheaper. The distinction between shade and waterproof fabric is the first thing to establish with the client before planning any other aspect of the project. The six Freeform fabrics are listed below along with some basic comparative information. For more detailed information, please see the download section of our website for brochures and certification.

Gale Pacific Commercial 95 (shade only)

- 340 gsm HDPE (High Density Poly Ethylene) fabric, the staple of our shade sail production.
- The biggest selling knitted shade cloth in the world, sitting at the top end of the market in terms of quality and longevity.
- Available in 17 colours, including bright primary colours ideal for schools, as well as more muted colours ideal for residential projects.
- 10 year warranty from fabric manufacturer.
- Construction is stitched with Teflon thread and webbing perimeter.

Gale Pacific Commercial FR 300 (shade only)

- 295 gsm HDPE (High Density Poly Ethylene) fabric, very similar to Com 95, but Fire Retardant.
- FR certification is required for most internal commercial projects and some external projects where the fabric encloses the occupants.
- Available in 8 basic colours.
- 8 year warranty from fabric manufacturer.
- Construction is stitched with Teflon thread and webbing perimeter.

Pro Knit Monotec 370 Series (shade only)

- 370 gsm heavy duty HDPE (High Density Poly Ethylene) fabric, considered to be the very best on the market.
- 100% monofilament construction, meaning it has no flat infill yarns, making it very strong and stable.
- Available in 15 colours, including bright florescent colours ideal for schools, as well as more muted colours ideal for residential projects.
- 15 year warranty from fabric manufacturer.
- Construction is stitched with Teflon thread and webbing perimeter.

Ferrari Stam 6002 (waterproof)

- 630 gsm PVC (Poly Vinyl Chloride) fabric, with a unique textured matt finish.
- 100% waterproof and fire retardant, it combines the aesthetic appearance of canvas with all the benefits of PVC.
- Available in 12 muted colours, the texture and palette make it ideal for residential or lifestyle projects.
- 5 year warranty from fabric manufacturer.
- Construction is welded with webbing perimeter sewn with Teflon thread.

Ferrari 502 Satin (waterproof)

- 570 gsm PVC (Poly Vinyl Chloride) fabric, with a unique satin finish.
- 100% waterproof and fire retardant, 502 is the staple of our waterproof canopy production.
- Available in a huge range of 40 colours to suit any type of project, commercial or residential.
- 10 year warranty from fabric manufacturer.
- Construction is welded with cable perimeter for ultimate strength and stability.

Ferrari 832 (waterproof)

- 850 gsm PVC (Poly Vinyl Chloride) fabric for heavy duty commercial applications.
- 100% waterproof and fire retardant, it offers increased strength, stability and wear resistance.
- Available in 7 basic colours from white, greys, blues to black.
- 10 year warranty from fabric manufacturer.
- Construction is welded with cable perimeter for ultimate strength and stability.

2. Form - The Freeform range gives you a choice of 3 different form types, as follows.

Flat

The 'flat' form type is a simple 2 dimensional flat shape that doesn't require us to use any seam shaping within the body of the canopy. However, it is important to make sure that your structure is actually flat (or near to it) before quoting the job at this price. If the canopy only has three corners (i.e. a triangle) it can only be flat, even if the fixing points are at different heights, but as soon as you have 4 or more fixing points, you have the potential to create a 3 dimensional shape, which would then make it a 'hypar'. Keeping it flat doesn't necessarily mean the canopy has to be perfectly horizontally though; it can still be flat even if it is pitched vertically or at any angle in between, just so long as the canopy surface is flat and 2 dimensional.

The seaming for a flat canopy generally runs parallel to its longest edge, which makes it the cheapest of the three form types due to its simpler design process and more economical cloth consumption. However, it should be noted that the canopy surface on a flat form is not as stable or taught as a hypar, so if you are using it in conjunction with a waterproof fabric, you should make sure you have a minimum 1:4 fall for rain run-off.



Hypar

The 'hypar' form type is similar to the flat, but allows for undulating height differential in the fixing points, which creates a 3 dimensional shape requiring us to use negative seam shaping. You can use as much height differential as you want, but as a rule, we recommend 1:4, which means a 4m square would have a 1m height differential between high points and low point. You need a minimum of 4 corners to create a hypar, but you can go up to 8 corners within the parameters of the Freeform, although even numbers generally work better as you always end up with a high next to a low.

The seaming for a hypar is generally run diagonally from high-point to high-point and our patterning software works out the correct amount of negative shaping required to allow the fabric to adopt the 3 dimensional shape.



Conic

The 'conic' form features a central apex point within the canopy, creating a 3 dimensional shape that requires us to use negative seam shaping in a radial pattern. To process conic orders using our on-line measuring forms, the outer fixings must all be level; each outer edge must be the same length; and the apex must be central. This is normally the case as most conic structures have a single mast with a fixed frame. However, if everything is uneven, it is not a problem, but the site will probably require a laser survey in order for us to plot the fixing points and pattern the canopy.

The seaming for a conic runs radially from the apex down to each corner with additional seams in between as required. The height of the apex can vary, but we recommend 1:4, so for a 4m square, the apex would be 1m higher than the outer fixing points.



3. Load - The Freeform range gives you a choice of 2 different load cases, designed primarily to ensure the strength of the build specification is appropriate to the site. We reference these in relation to the wind speed they are guaranteed to, as follows.

LC30 - 30mph wind and/or 150mm of snow

LC60 - 60mph wind and/or 300mm of snow

This means that the canopy is guaranteed to withstand winds speeds and/or snow depths up to the stated amounts without any danger of damage or failure. We use safety factors on all our components, so in reality there shouldn't be any sign of damage or failure until at least 50% more than the stated wind and/or snow, but this is the point where our guarantee stops (please see our separate warranty document for further details).

The fabric itself and the patterning we do is the same for either load case, but the perimeter webbing or cable and the corner fixings we use for a given size are bigger and stronger for the LC60. The vast majority of Freeform canopies we make are to the higher LC60 specification, but if the canopy is being used indoors or only temporarily outdoors, the lighter build specification of the LC30 is usually more appropriate as well as being slightly cheaper.

4. Perimeter - The Freeform range uses the total perimeter length of the canopy as measured between the site fixing points to calculate the price. This is in contrast to most other fabricators that use an area calculation, which can be very hard to work out at the planning stage on random shapes, especially when there is height differential as well. The maximum perimeter range depends on the load case selected, but must be between 4m to 24m for LC30 and 4m to 40m for LC60. It is important to remember that the perimeter needs to be measured between the site fixing points on the slope if you have height differential, so be careful to allow for this if you are quoting from a plan view drawing.

5. Corners - The Freeform range caters for 3 to 8 corner fixing points across all three form types; so that's basically a triangle up to an octagon. However, we don't generally use the shape names as they tend to infer nice even shapes, whereas most of the canopies we make are random shapes, so we express them numerically instead e.g. 3 corner up to 8 corner. The corners can be arranged around the shape however you want to suit the site, so you could have 2 close together in one area and 2 wide apart in another, just so long as you don't exceed 8 corners in total within the permitted perimeter range.



Sales Tools

To support our trade customers, we have the following sales tools available via our website www.sdsails.co.uk

1. Fabric Swatch Books & Samples

With six standard fabrics in the Freeform range, available in multiple different colours, there are over 100 different options to choose from.

We stock full swatch books for each range as well as individual samples, which we supply free of charge. However, we only get a limited amount of the full swatch books from the fabric manufacturers, so unfortunately we can only offer two or three of each to our trade customers to show their potential clients, but you can have as many of the individual samples as required to leave with them.

The samples are cut from our production wastage and labelled in-house with just the fabric brand and colour code information. None of our swatch books or samples come with SD Sails or Freeform branding on them, so there's no danger of the client contacting us directly.



We also offer a free postage service for the samples via our website, where you can order up to 10 at a time to be posted to you, or directly to your client. Again, there is no mention of our name anywhere on the envelope, but we are very happy to include one of your compliment slips or print off your own delivery note to include in the envelope if sending direct to a client.



2. Corner Samples

In addition to the swatch books and fabric samples, we also have samples of all the Freeform corner types, available to purchase. These are made to order in whatever fabric type or colour you want and can also feature your own label if required. Whilst all our corner fixing are universal in the angle they can cater for, we have 4 different webbing sizes and 5 different cable sizes available to accommodate the range of perimeter sizes we cover. There are more detail on our corner systems under the Design and Construction headings of this document, but please call our office on 01403 740020 if you would like to order any corner samples.



3. Online Quote System

Whilst we're always happy to provide a written quotation on email, the secure trade area of our website www.sdsails.co.uk also features our online quote system, which is a very useful tool to have during your selling and planning process.

Once you have been given your personal trade login details, you can access our system from any web browsing device, where by specifying the 5 Freeform parameters from simple drop down boxes and inputting a project reference, you can get an instant quote in seconds. This can then be saved to our data base for you to submit with an order at a later date if required.

SDSAILS Trade Area Mon - Fri: 08:30 - 17:30 +44 (0) 1403 740020 info@sdsails.co.uk LOGOUT

Get a Freeform Quote QUOTES SAMPLES DOWNLOADS

Fabric: Select a fabric ... Form: Select a form ...
Load case: Select a load case ... No. of corners: Select no. of corners ...
Perimeter: m Project reference:

GET QUOTE

EXISTING QUOTES

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You can create as many quotes as you like, and once you are familiar with the options, it takes no more than 30 seconds to get a price.

SDSAILS Trade Area Mon - Fri: 08:30 - 17:30 +44 (0) 1403 740020 info@sdsails.co.uk LOGOUT

Get a Freeform Quote QUOTES SAMPLES DOWNLOADS

Fabric: Commercial 95 (shade) Form: Hypar
Load case: 60 No. of corners: 4
Perimeter: 28.585 Project reference: Sample project

GET QUOTE

Quote : £840.40 +VAT

SAVE QUOTE EXISTING QUOTES

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Measuring

You may well have taken rough measurements of the site or received some from your client in order to quote on the job, but if the job goes ahead, accurately taking all the necessary measurements from the site is a vital part of making sure the canopy fits properly. There are only 7 different measuring forms required to cover all combinations of the Freeform range, and they are all available to download from the trade area of our website at www.sdsails.co.uk

If you are ordering a canopy for a fixed CAD designed structure, you can take the measurements directly from the model for a quotation and then submit the file if you want to proceed, but the following process is recommended for measuring a bespoke site.

1. Measuring Form

Select the correct measuring form for the structure. Fill out the information required at the top of the form.

2. Referencing the site

Align the drawing to the site and decide which post/fixing you want to use as point A. To ensure you remember this, either mark the drawing with a memorable feature (i.e. fence, building, North, etc.) or mark the actual post/fixing with the letter A. Working clockwise, reference or mark the subsequent posts/fixings B, C, D etc.

3. Measuring perimeter and diagonals

Using appropriate working at height equipment and a long fibreglass tape measure, tie the zero point to the bearing face of point A and measure in millimetres directly to the bearing face of every other fixing point. If the fixing points are at different heights, measure directly with the tape on the slope. Record these measurements in the appropriate box on the measuring form to the nearest millimetre. Please do not round the dimension up or down. Move the zero point of the tape measure to point B and repeat the process until all the perimeter and diagonal measurements required on the form are filled out. Whether the structure is flat, hyper or conic, we can now plot this shape in our software and build the canopy.



4. Measuring heights

Although not strictly required to plot the shape, height measurements act as a secondary check to the perimeter and diagonal measurements and allow us to visualise rain run-off and arrange seams accordingly. To measure the fixing heights accurately, you must first set up a level datum line around the structure. This can be done with a laser level or a simple water level (www.wikihow.com/Use-a-Water-Level). It doesn't matter how high you make the datum line, but it must be on or below the lowest fixing point. From the level mark on each post/fixing, measure vertically to the bearing face of each fixing point, and record these measurements in the appropriate box on the measuring form to the nearest millimetre.

Leica 3D Disto

Steps 3 and 4 can be done single handed and without a ladder by using a Leica 3D Disto, available to hire or buy from SD Sails. After some basic training, this machine is quick and accurate to use and plots the fixing points directly to a dxf file in 3D using a laser beam and zoom camera controlled on the handset. The data displayed on the handset can be used to complete your online quote and the dxf file can then be submitted directly to us on email for production. Once you're used to this method, you'll find it a quick way to measure up to quote your client, and then if they go ahead, you have everything you need to place an order without returning to site.



Ordering

Ordering is simply done by emailing your quote, measuring form and purchase order to info@sdsails.co.uk and we will issue you an order confirmation by return, confirming the total price with any additional hardware and carriage costs that you may want added in, along with the estimated completion date.

Lead time & Express options

We aim to deliver a standard lead time of 2-3 weeks at any time of the year and always aim to fit in with your schedule whenever possible. However, if you need the job urgently and it is not possible without us laying on overnight or weekend shifts, we have various express rate options to cater for this as follows.

2 weeks – 25% extra

1 week – 50% extra

1 day – 100% extra

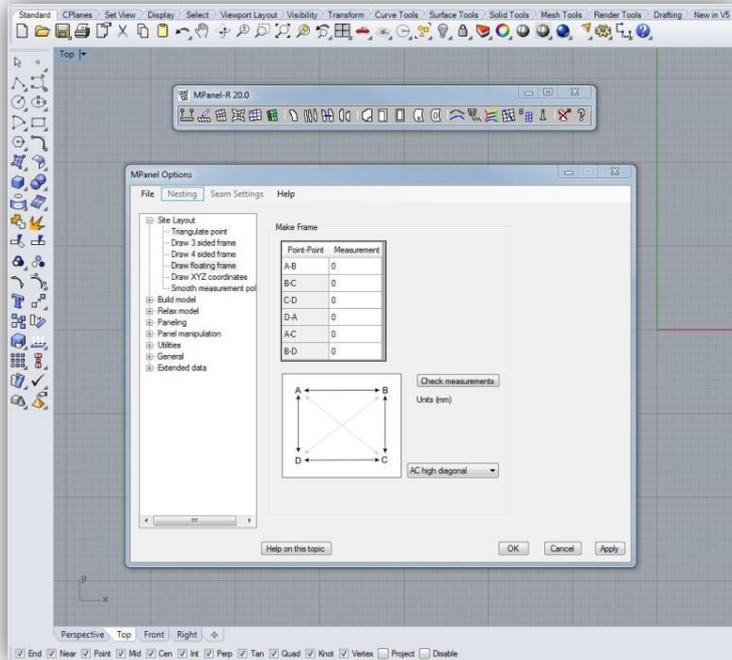
These surcharges only apply to the canopy itself. They do not apply to any additional hardware or carriage costs, and are subject to the materials being available and the staff being available to work overtime.



Design Process

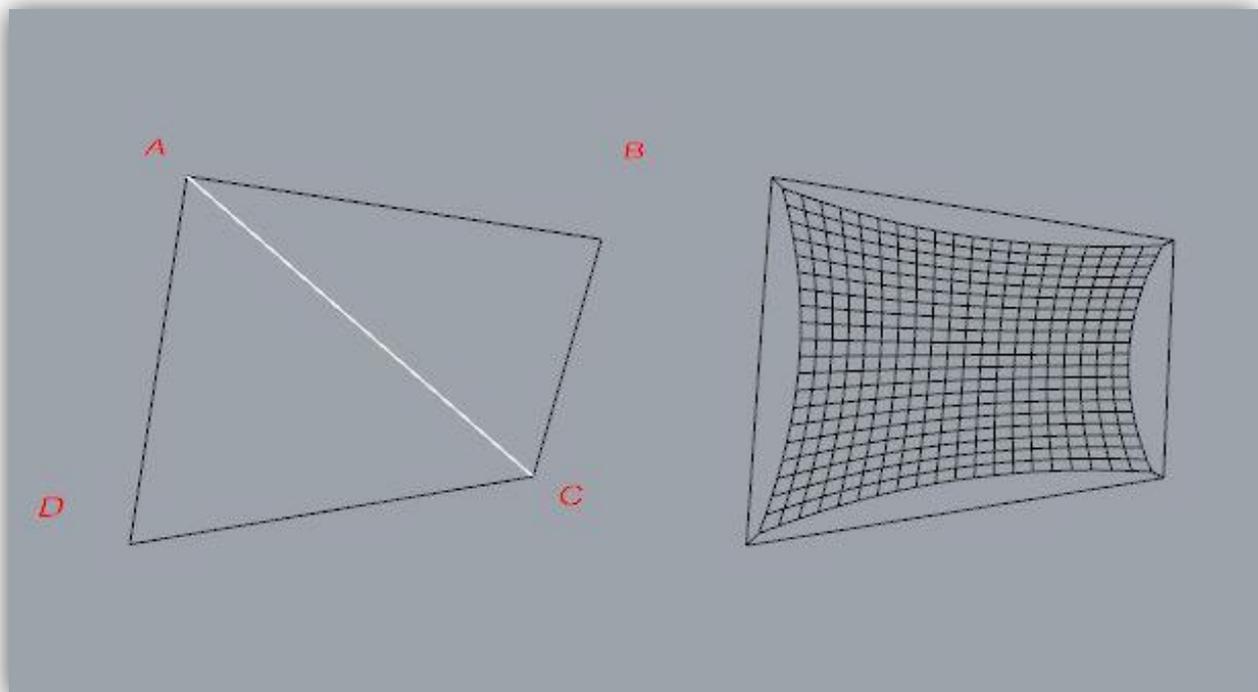
1. Plotting the Dimensions

Once your order is in our work schedule, we get to work as quickly as possible to check that the dimensions you've submitted plot correctly. We do this on computer using Rhino as our 3D CAD design platform and a plug-in module called M-Panel, which is a specific tensile membrane patterning software program. M-Panel allows us to type the dimensions for any given shape in to a template that corresponds with our measuring forms, so it is important to use our forms (or a copy of them) so the information is in the correct format to avoid any confusion.



The software then checks the dimensions for any degree of error before plotting them. It is not unusual for a small error to flag up as the software works to fractions of a millimeter, but we allow anything up to a 5mm error to pass. Anything more than this will be reported back to you and it is then your decision if you want to allow it to pass or if you'd rather do further checks. It may be a simple case of a number being transposed incorrectly, but potentially it could mean remeasuring the site. We can tell you how big the error is, but unfortunately we can't tell you which dimension is the incorrect one, so if this happens, you need to double check everything. This is where surveying the site is so much better with the Leica laser, as you are actually plotting the fixing points directly to a 3D CAD file, rather than supplying measurements for us to plot later. Either way though, this is why accurate measurements are so important.

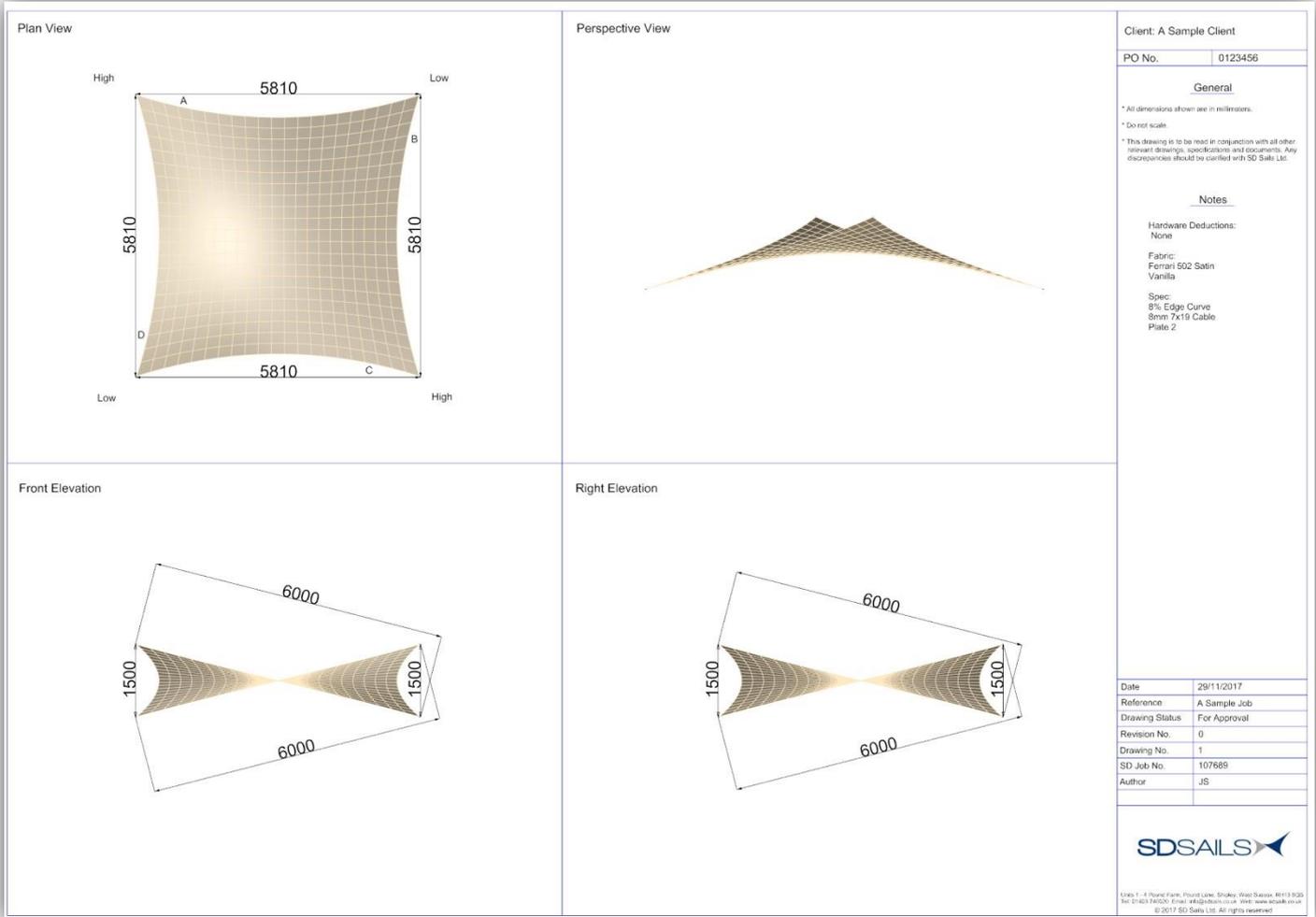
Once the fixing point dimensions have plotted in 3D, we run through various different settings within M-Panel to create the 3D mesh on screen that will eventually create the panels required to cut the canopy. These settings include the depth of the edge curves and the length of the corner links required. This is generally known in the industry as Form Finding. When the mesh has been relaxed to its optimal shape, the link lengths will be pointing in exactly the right 3 dimensional position to provide optimal tension in the canopy surface and boundary.



2. Approval Drawings

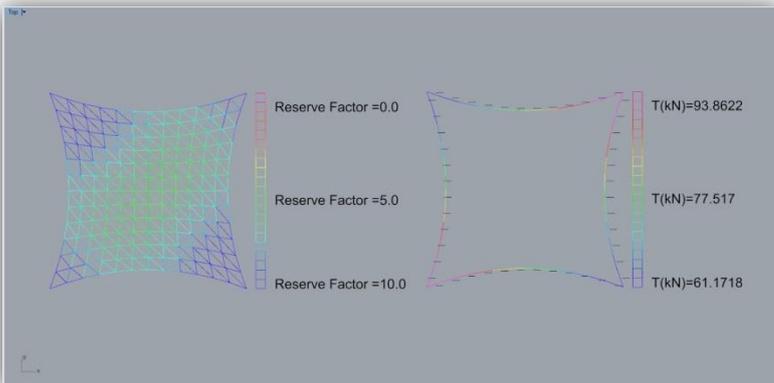
Once we have your fixing points plotted with the canopy mesh and corner links in place, we send this across to you in a pdf format. This gives you the chance to check that you are happy with the shape and size of the canopy before we go ahead and make it.

We ask that you give us a written response on email to confirm that you are happy for us to proceed. By giving us your confirmation, you are simply confirming that the dimensions on the drawing are in accordance with the information you provided; the finished shape and fit of the canopy is still our responsibility, but should there be an issue, you will need to demonstrate that the site is as per these dimensions.



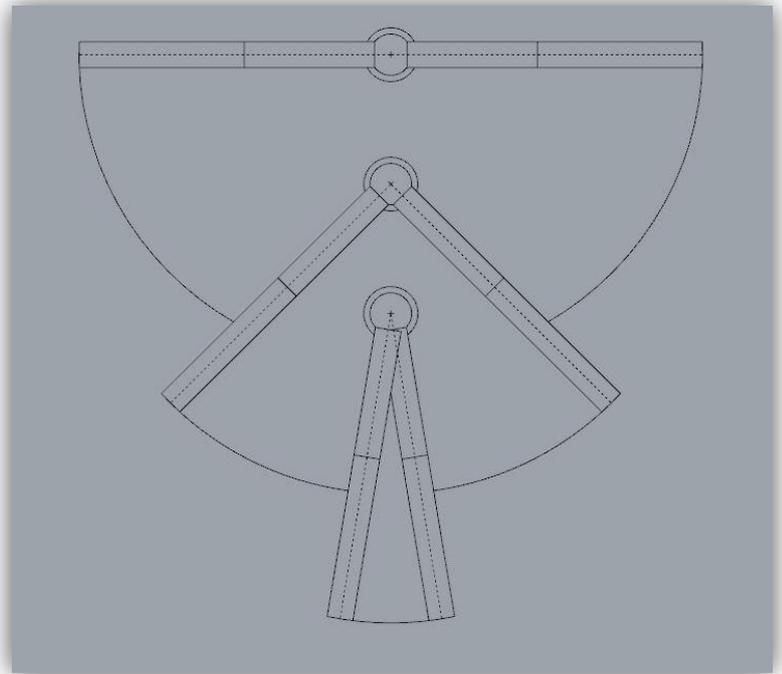
3. Load Analysis

Once we have your approval to proceed, we need to analyse the potential loads in the canopy under wind and snow conditions in order to decide what size boundary cable/webbing and corner hardware to use. We draw on pre-analyses data for regular shapes, but if it is a very odd shape, we will run a specific FEA analysis in M-Panel to confirm any potential changes. The M-Panel FEA software also tells us what reserve factors we have in each element, as well as plotting rain run-off and fabric deflection maps.



4. Corner Design

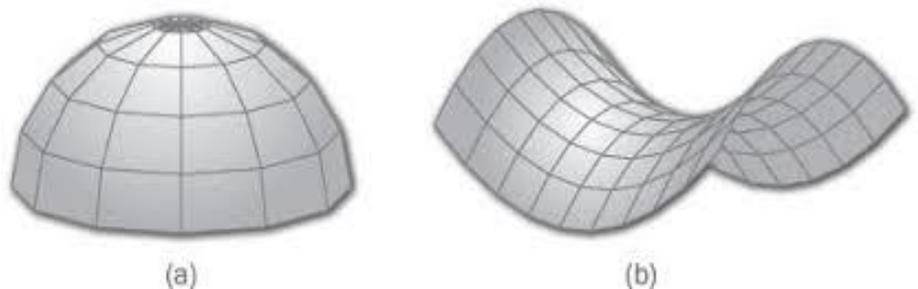
One of the key aspects of the Freeform concept is the use of round corner fixings, which work on any angle of corner, both in terms of design and construction. The construction aspect is covered further on under the Construction heading, but from a design aspect, it means that every corner is designed in the same way, making the process quick, simple and uniform. The principle is that the two edges of the canopy and the corner link all point at the centre of the circle, and we simply offset the centre line to accommodate the width of the webbing or cable. The offset from the centre of the circle to the bearing point for the corner hardware is also consistent, and this distance is allowed for in the link length deductions.



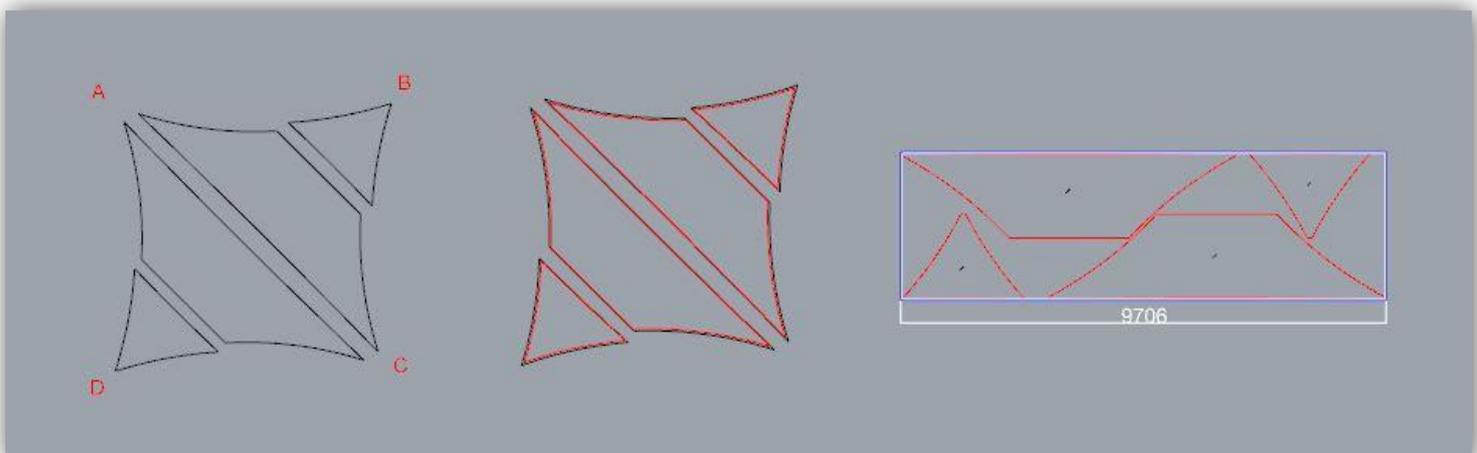
5. Patterning & Nesting

The next stage of the design process is to split up the 3D mesh in to flat 2D panels, which is done automatically by the M-Panel software. The size of the panels is determined by the width of the material and also the amount of 'shear strain' the material will accept. This shear strain is calculated by the software as a percentage of how much each panel has to contort to form part of the 3D shape. The more panels you have, the less each panel has to contort, and this directly relates to the biaxial test data for each fabric.

As well as the pronounced concave curves in the perimeter edges, each panel also has a slight concave curve in each seam edge, which when joined together, provides the negative shaping required to form the anticlastic tensile shape. 'Anticlastic' is a good word to impress people with every now and then and basically means a shape with opposing curves (example b), which requires negative seam shaping to create. The opposite 'Synclastic' shape has curves in the same direction (example a) and requires positive seam shaping to create.



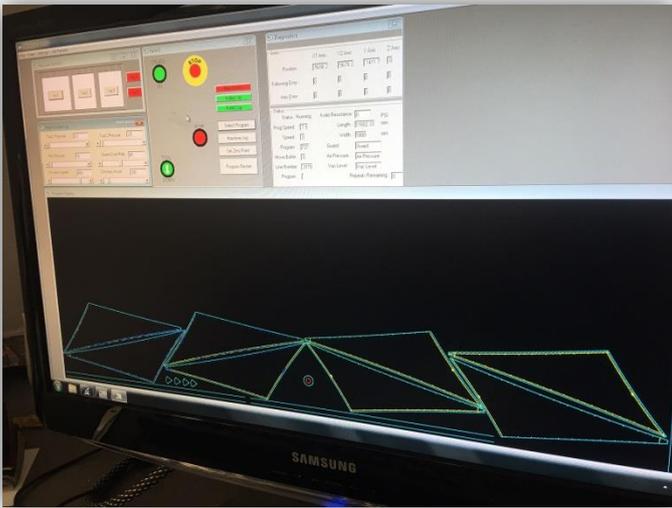
When we are happy with the results, we then apply a small amount of shrinkage to the panels, called 'Compensation', which allows for the stretch in the fabric, before applying the offsets required to create the seam overlaps and perimeter hems. We also add panel numbers, corner references and strike up marks, which are small dashes all along the seams to ensure the panels are joined in the correct alignment. The final stage is to nest the completed panel designs in to the fabric width and cutting table length so it is ready to send to the cutting machine.



Construction

1. Cutting

Unlike the majority of imported shade sails, every canopy manufactured at SD Sails is computer cut as well as computer designed. This means that both accuracy and cloth efficiency are very high and every detail of the finished product is in place from the outset. Our Blackman & White cutting machine is one of the largest in the UK, at 15m long by 3m wide, designed specifically to take the extra wide roll widths used in shade fabrics. It features 4 tool heads, 2 for marking different types of fabric, and 2 for different types of cuts. The cutting surface is a huge vacuum bed that suctions the fabric firmly down to the table to ensure it doesn't move as the tool head travels over it. The computer control panel runs the marking tools first, to draw the panel references, seam offsets and strike up marks directly on to the fabric, before running the cutting tools, ensuring accuracy carries right on through to the production assembly.



2. Welding

Once cut, all of our waterproof fabrics go directly to one of our high frequency welding machines to be joined together. These two high powered Fiab machines travel independently on a 20m track, and are capable of welding up to 1.3m lengths in just a few seconds. Before the welding though, we tack the panels together with an ultra-sonic tack gun, which aligns all the strike-up marks put on the panels by the cutter. The panels then go under the main welder to be permanently fused together. The width of the seam varies depending on the size of the canopy, but this process ensures the join is at least as strong as the fabric itself and is 100% waterproof. The corner reinforcing and cable edge pockets are then also fully welded in place.

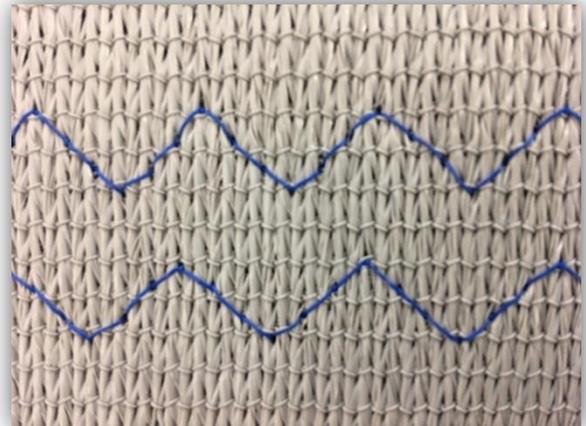


3. Stitching

All of our shade fabrics go straight from the cutter to the stitching department where we have a 200m² work bench, housing multiple heavy duty industrial sewing machines, designed for various different tasks.



However, before stitching, all the shade fabrics are heat sealed on the seam edges and stuck together with a double-sided tape to ensure an accurate and smooth join. The seams are then run through our 3-step seaming machine twice, which creates a strong and flexible seam that can expand with the fabric when the canopy comes under high loads. Most imported shade sails use two lines of straight stitching, which does not expand, so the thread can fail under pressure. Another big difference with our sewing is that we only use Tenara thread, which is a Teflon based product, guaranteed not to degrade in the UV for up to 15 years. Tenara thread is about 12 times the price of the standard Polyester thread most imported sails use, which only lasts about 3 years in continuous UV, so it's a cost we are prepared to swallow.



The canopy then moves on to our webbing machine to have the perimeter webbing sewn on. This is a unique twin-needle machine we have had especially designed and built to hem the fabric edge, feed on the webbing and sew both edges all in one process.

The webbing thickness/load rating varies depending on the size of the canopy, and the pre-tension it is fed on with varies depending on the stretch characteristics of the fabric.



4. Corner Finishing - Webbing

The corner design and construction is without doubt the most important factor of any tensile canopy, and the development of our universal angle systems is key to the Freeform concept. The construction is different for webbing and cable edge, so each is explained separately below.

Traditionally, webbing edge shade sails use D-rings in the corners, which are fine on small sails with narrow corners, but D-rings do not come strong enough for a large sail to be safe in high winds, or wide enough to be effective on corners over 90 degrees. Round rings overcome both these problems.

We have 4 different load rated webbing/ring combinations to safely cover all the sizes catered for in the Freeform range, as follows.

- 38mm wide 2.2 tonne webbing with a 6mm x 60mm ring
- 50mm wide 3.0 tonne webbing with a 8mm x 80mm ring
- 50mm wide 5.6 tonne webbing with a 10mm x 80mm ring
- 50mm wide 10 tonne webbing with a 12mm x 80mm ring



The perimeter sizes that the different webbings are used at varies depending on the Load Case selected, but they have a safety factor of at least 2 at the maximum wind and snow load stated, meaning there shouldn't be any signs of stress or failure until well past the guarantee cut-off.

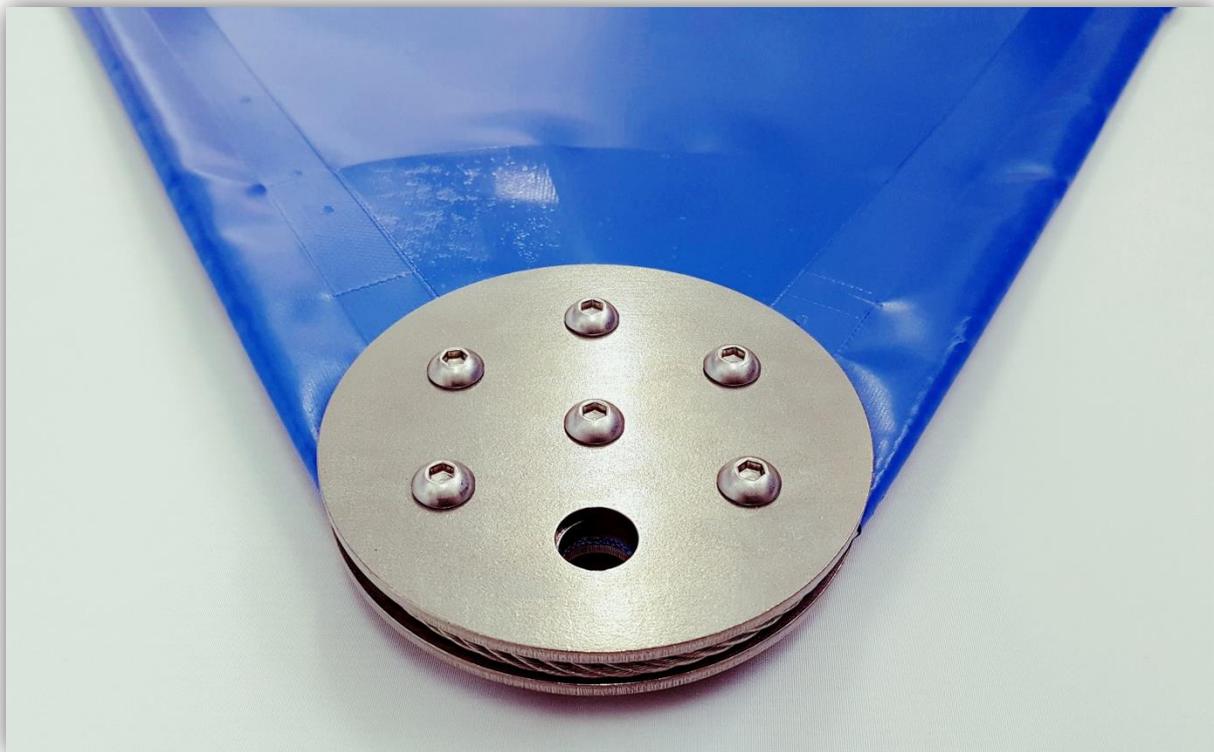
The stitching is also an integral part of the strength of the corner, so the amount of stitch lines increases with the webbing load to ensure it is up to the same strength. This is the thickest part of the whole canopy to stitch and as such demands a seriously heavy duty sewing machine to cope with it – we call this huge machine 'The Tank'.

5. Corner Finishing - Cable

The cable edge corner system works on the same principle that a round fitting can accept any corner angle. However, rather than the rings that allow webbing to loop through them, we use a plate system that allows a fixed length continuous cable to pass around the perimeter. There are in fact three plates per corner; two outer plates and one smaller inner plate that forms the groove for the cable to sit in. These are all firmly bolted together to grip the reinforced fabric corner, leaving one large attachment point for the corner hardware to link on to. If you order your corner hardware from us along with the canopy, the attachment point hole is just the right size and position for the hardware to fit directly on to. The canopy is supplied with the cable permanently installed and the bolt holes punched out in the corners, but the plates and bolts are packaged separately to install on site. This is to avoid any potential damage to the fabric during transit and unpacking.

We have 5 different load rated cable/plate combinations to safely cover all the sizes catered for in the Freeform range, as follows.

- 4mm thick 1.0 tonne cable with a 100mm diameter plate
- 5mm thick 1.6 tonne cable with a 100mm diameter plate
- 6mm thick 2.3 tonne cable with a 125mm diameter plate
- 8mm thick 4.2 tonne cable with a 125mm diameter plate
- 10mm thick 9.5 tonne cable with a 175mm diameter plate



All the cable corners up to 8mm look virtually the same, but the 10mm cable on the large 175mm plate is a bit different. The reason for this is that the 10mm cable is too thick and stiff to bend around the plate in a continuous loop, so it has to be terminated at each corner. The cables are still fixed length, so it is still a relatively easy install on site, but the cables are also then packaged separately with the plates and bolts to install on site.



6. Cable Swaging

The exact length of the Freeform perimeter cables are calculated and cut to the millimetre from the CAD design for the canopy. These are terminated to a fixed length and are non-adjustable, which makes installation easy as there is nothing on the cable to adjust.



All the cables up to 8mm are swaged in a continuous loop with our end-to-end swage terminal that fits neatly in the edge pocket out of sight, using our 30 tonne Hex-Lok swage press. The big 10mm cable has individual eye terminals swaged on at each end using our Wiretechnic role swager.

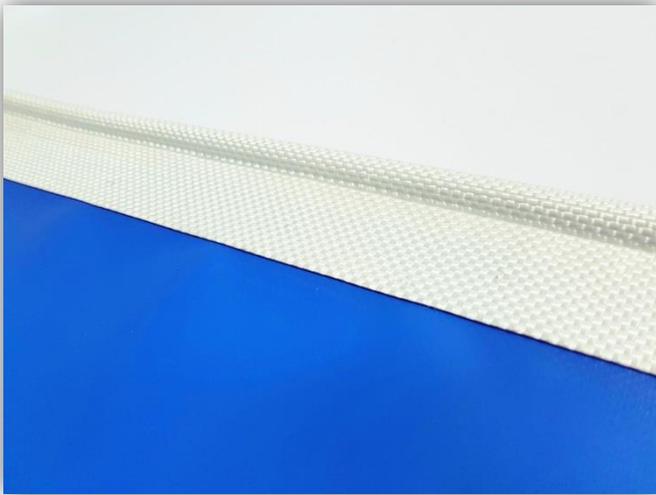
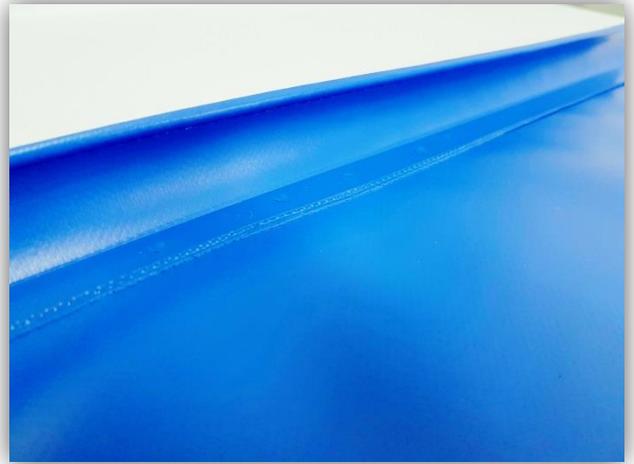


Optional Extras

There are 3 optional extras you can add to the construction for an additional cost, as follows.

Rain Run-off Upstand

You can have a colour matching up-stand permanently fitted to any side of a cable edged waterproof canopy. This simple curled strip is welded to the pocket seam and acts as a gutter to stop rain water dripping straight off the edge of the canopy by deflecting it down to a low corner. This option is not available with webbing edge fabrics.



Bolt Rope

A bolt rope added to an edge allows you to attach part of the canopy directly to a building with a keder rail. It can be fitted to any fabric, shade or waterproof, to eliminate the gap between the building and the concave curve of the canopy. We can either use a bolt rope to fit your own keder rail, or we can supply various rail types to fit the job.



Covered Webbing

We only stock black and white load rated webbing to use on the perimeter of our webbing edged fabrics, but if you don't want a colour contrast, we can cover the webbing in the canopy fabric to make the colour uniform throughout. This is done by hemming on an additional strip of fabric that is then wrapped around the webbing during the stitching process.

Branding

Branding or printing isn't something that we offer ourselves at SD Sails, but we recommend the services of Ocean Art, based near Southampton. They have a fantastic gallery of work and use very cost effective and hardwearing methods, especially suited to one-off or small quantity applications.



From a logistical perspective, the service from Ocean Art also works really well for us as they print directly on to the finished job, meaning we can complete your order and send it on to them for you to deal with them directly. You can book the job in with them and arrange your artwork whilst it is in production with us, so they can be ready to go once we have finished.

If branding is of interest, please visit their website www.oceanart.co.uk and contact them directly. Please refer to SD Sails in your communication and state the fabric type so they know what inks to use.

Hardware

We stock a range of marine quality stainless steel tensioning and fitting hardware that is available to order with the canopy, as follows.

- Bow Shackles M8 to M20
- Rigging Screws M8 to M20
- Strap Toggles M12 to M20
- Eye Bolts M8 to M16
- Eye Plates 8mm to 16mm
- Carbine Hook 8mm only

There are several advantages to ordering and using our hardware. You get to choose what type of hardware you want to use, and..

- We take responsibility for the size to ensure the load rating matches the canopy
- We take responsibility for the link length deduction to ensure it is correct for the item
- The hardware is guaranteed to fit our Freeform corner ring/plate correctly
- The hardware is covered along with the canopy under our 3 year Freeform guarantee
- Many of the items are unique to us and not available elsewhere
- Pricing is very competitive – please see our separate hardware price list



You can use your own hardware if you prefer, but it is then your responsibility to stipulate the link length deduction you want us to use and check that it fits on to our corner rings/plates correctly.

Packaging & Transportation

All Freeform canopies finish the production line by being neatly folded and wrapped in heavy duty white polythene plastic. The waterproof fabrics are also pre-wrapped in off-cut PVC to further protect them for transportation. The plates and hardware are wrapped separately in bubble wrap to protect the canopy fabric. You will be notified by email as soon as your order is complete and ready to ship.



You can also collect your orders from our workshop reception if you prefer, but the majority go out on our daily collection over-night courier service. Packages up to 30kg will go on our parcel courier, but orders over that weight will be sent on our pallet network. We can also offer timed morning deliveries at an additional cost if required.



All goods are fully insured by SD Sails whilst in transit until received and signed for, but please note if you are collecting, the goods become your responsibility at the point of collection.

Installation

Once you've received the order, it's over to you to install it. The following is our guide to a successful installation.

1. **Unpacking**

Ensuring the area under the structure is clean and free of any sharp objects, start by laying out a heavy duty tarpaulin, ideally bigger than the canopy itself. Lay the packaged canopy in the centre of the tarpaulin and carefully remove the packaging. Unroll the canopy completely in one direction and then the other, being careful not to allow the corner hardware to fall and damage the fabric.

2. **Positioning**

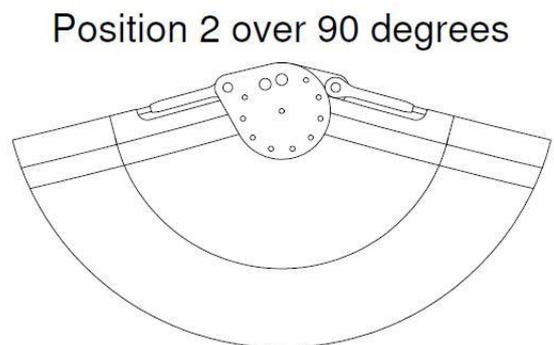
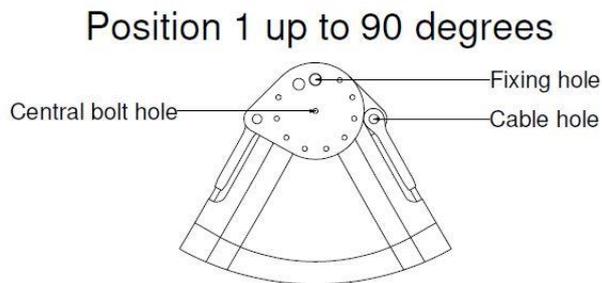
Ensuring the canopy is the correct way up (if webbing edge, the webbing is underneath; if cable edge, the shiny or textured side of the fabric is on top), rotate the canopy on the floor so the corner references align with the correct post/fixing references.

3. **Hardware**

Unpack the hardware and arrange on the floor next to each corner of the canopy. Extend the tensioning hardware to its longest length ready to fit to the corner ring/plate on the canopy. If the canopy is webbing edged, go straight to Fitting.

4. **Plates**

If the canopy is cable edged, fit the corner plates and bolt them down tightly through the pre-cut holes - it is personal choice if you want the bolts pointing up or down. For the smaller 100mm and 125mm plates, have the smaller central plate on the bottom side of the canopy. For the large 175mm plate, there is no central plate, but there are two positions depending on the corner angle. To fit, position a plate on each side of the fabric pointing in opposite directions and loosely locate the central bolt. Rotate each plate until one of the fixing holes aligns with the large hole in the canopy whilst the cable hole aligns with the pocket.



5. **Cables**

Cables up to 8mm will be pre-installed, but the large 10mm cables will need to be inserted in to the appropriate edge pocket. The cables will be labelled with the appropriate corner reference at each end so you know where they go. Once in the correct pocket, position the cable eye on the fabric side of the plate and connect to the corner plate using the clevis pin provided and secure with the split pin.

6. **Fitting**

Using appropriate working at height equipment, connect the tensioning hardware to the highest post/fixing point first, and then an opposing corner to lift the canopy off the floor. Please note, great care must be taken at this point not to allow the canopy to drag on the floor or flap about in the wind in order to avoid damaging the fabric.

Follow on connecting all the remaining corners so the canopy is completely suspended in the air with all the tensioning hardware still loose.

7. **Tensioning**

Using appropriate tools and working at height equipment, begin tensioning the corner hardware at the highest post/fixing point first by about 25% of its range. Tension the opposing corner by a similar amount, and then all the remaining corners. Repeat this process 2 or 3 times until all corners are fully tensioned to the same position on the threads and the canopy is taught, stable and crease free. The perimeter of the canopy, webbing or cable, should be very solid with minimal movement.

8. **Locking off**

It is vital that all threaded tensioners are locked off with the secondary locking nut, firmly turned against the primary nut. Failure to do this may result in the tensioner slackening off over time, causing the canopy to be loose and potentially voiding the warranty. It is advised that the tensioners are checked periodically to ensure they remain properly locked off at all times.

Maintenance

It is recommended to have a regular cleaning and safety check schedule in place for all canopy installations. This is either a service that you can provide to your clients for an agreed cost, or information you can provide for them to do themselves.

Cleaning

There is specific information provided by each fabric manufacturer available in the trade download area of our website, but in general terms, all our fabrics benefit from a wash with a mild detergent in warm fresh water using a soft brush or mop. This should always be followed by a good rinse off with a hose to remove any residue. The more often this is done, the less chance there is of permanent stains developing, but twice a year is a basic minimum. Generally, this is better done with the canopy in situ as the fabric stays taught and smooth, but this can then require height access and long brushes to clean the top side. If you want to outsource this job, we recommend the services of Rainbow International. Please contact them directly by visiting www.rainbow-int.co.uk/horsham and please refer to SD Sails in your communication.

Safety Checks

We recommend that the canopy and supporting structure are checked for any deterioration at least twice a year, and especially after periods of high wind or snow. The Freeform guarantee only covers the canopy and the fixings provided by SD Sails, but we recommend that any posts, wall fixings, supporting walls or foundations are also checked for signs of cracks or movement that could lead to the failure. Particular attention should be given to the canopy corner tensioners to ensure they have remained fully locked off and show no signs of coming loose. If they have loosened or the canopy appears to have less tension than when it was first installed, the tensioners should be re-tightened and firmly locked off. It may be necessary to use Lock-Tight on the nuts if they have already come un-done.

The canopy fabric and stitching should be checked for signs of wear and tear that might have been caused by falling debris or deliberate vandalism. Particular attention should be given to any areas that appear significantly dirtier than others, as this could be a sign of water ponding, which could get worse if not investigated.

Any damage or significant wear should be reported back to SD Sails via email with pictures and a note of the canopy serial number. We will be happy to advise on the best course of action and help you to resolve the situation as quickly as possible.



Storage

If a canopy is to be taken down for any reason, the installation guide should be followed in reverse order. The canopy should be loosely folded parallel with the seams in to a long strip of about 0.5m wide and then rolled and tied in to a neat package. If the original transport bag is still available, this is an ideal container to keep it in, but if not, any non-abrasive bag or sack will do. The canopy should be stored clean and dry, out of the sun and away from any potential rodent attack.



SD Sails Freeform 3 Year Warranty

For a term of three years from the date of the original purchase invoice, all canopies manufactured under the Freeform name by SD Sails are covered under warranty in accordance with the following details :-

1. **Fabric** - The fabric make and colour name or code shall be in accordance with the specification on the order confirmation issued by SD Sails prior to manufacture. It is the clients responsibility to check that the order confirmation is correct and to advise SD Sails immediately if not. Please note, whilst every care is taken to ensure the colour of the fabric is uniform across the canopy, SD Sails do not accept responsibility for any colour variances deemed within tolerance by the fabric manufacturer; or variances visible due to light transmission or warp orientation.
2. **Size and shape** - The size and shape of the canopy shall be in accordance with the approval drawing issued by SD Sails, which will have been approved by the client prior to manufacture. Please note, the canopy dimensions are to a tolerance of +/- 1%, as measured when the canopy is fitted and under tension, which represents the potential elongation in the fabric. Should the canopy not fit as expected, it is the client's responsibility to demonstrate that the structure is to within a tolerance of +/- 5mm of the dimensions provided to SD Sails prior to the canopy manufacture.
3. **Link length** – The length and angle of the allowance made in the corner between the canopy and the structure (known as the link length) shall be in accordance with the approval drawing issued by SD Sails, which will have been approved by the client prior to manufacture. Please note, the link length dimensions stated on the drawing are taken from the centre of the corner ring or plate as measured when the canopy is fitted and under tension.
4. **Creases** – The canopy shall be free of any significant creases once it is properly tensioned in to place. Please note, the canopy needs to be maintained under tension for at least 2 weeks to allow any minor creases to settle in. Should the canopy still have any significant creases after this time, it is the client's responsibility to demonstrate that the structure is to within a tolerance of +/- 5mm of the dimensions provided to SD Sails prior to the canopy manufacture.
5. **Quality** – The canopy shall be supplied free of any manufacturing defects, such as cloth faults or mis-weaves (deemed outside of the tolerance permissible by the fabric manufacturer); missing or insufficient welds; broken or out of place or insufficient stitching. Please note, to avoid excessive localised stress during installation, the canopy must be installed as per our installation instructions (available separately on request).

6. **Wind/snow load** – The canopy is guaranteed to be safe and undamaged by wind or snow in accordance with the load case stated on the order confirmation issued by SD Sails prior to manufacture to the following limits-
- LC30** - 30mph wind and/or 150mm of snow
LC60 - 60mph wind and/or 300mm of snow
- Please note the warranty does not cover-
- (a) Damage caused by lack of tension due to the rigging coming loose or the structure or foundations moving or failing.
 - (b) Damage caused by external factors such as trees or branches coming in to contact.
 - (c) Damage caused by any person climbing on to the canopy.
 - (d) Damage caused by deliberate vandalism.
7. **UV degradation/fade** – The canopy is guaranteed not to suffer any significant fade or UV degradation during the term of the warranty so as to impede its performance, safety or aesthetic appearance. Please note, all of our standard fabrics also carry their own warranty issued directly by the fabric manufacturer, but any claims made against the fabric after this warranty has expired are to be pursued directly with the fabric manufacturer by the client.
8. **Damage** – The canopy is guaranteed to be free of any dirt or damage at the point at which it is received and signed for by the client. Please note, if the goods are being delivered by SD Sails, they shall be suitably packaged for transit in a securely loaded van and remain the responsibility of SD Sails until received and signed for by the client. If the goods are being collected, they shall also be suitably packaged for transit in a securely loaded van, but become the responsibility of the client as soon as they are received and signed for and upon leaving the premises of SD Sails. The client reserves the right to check the goods and report any damage prior to signing for them.
9. **Remedial action** – Should a breach of warranty be established, at its discretion SD Sails shall repair or replace or refund the price of the defective goods. Please note, this warranty agreement should be read in conjunction with SD Sails’ Terms & Conditions previously supplied (additional copies available on request), and in accordance with point 9.2(b), SD Sails’ total liability to the customer shall not exceed 105% of the price of the goods supplied; and point 9.2(c), SD Sails is not liable for the cost of removing, transporting or reinstalling the goods.