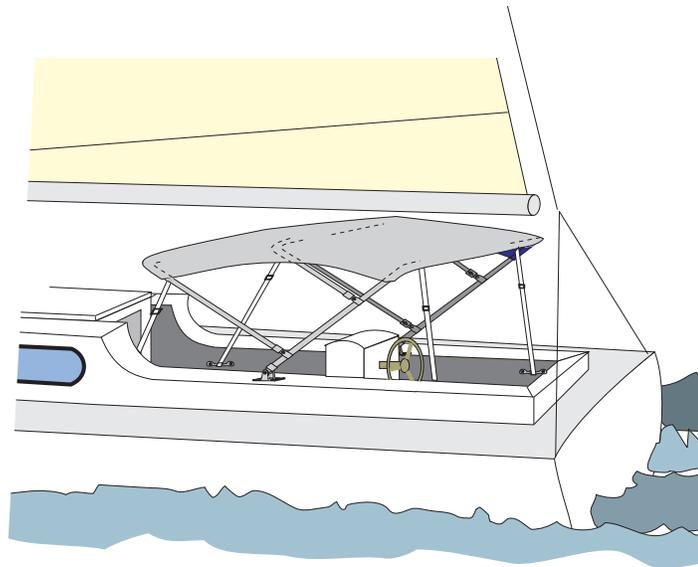




Self-Reliance Under Sail

3 Bow Bimini Boat Top Instructions



We all like to sail on bright, sunny days. But too much sun has ruined many a cruise. So have rain and drizzle. A bimini extends the range of "comfortable" sailing greatly by providing shelter from the sun or from rain without creating a "closed in" feeling. It can, of course, be used when under sail or at the dock. It can also be folded away when not needed with very little effort.

The Bimini we discuss here is a simple one. Only the sleeves and tails along the forward and aftward ends are likely to cause some head scratching. These sleeves feature zippers so the Bimini cover can be quickly removed for storage or cleaning. We have used a binding tape all round the cover in-

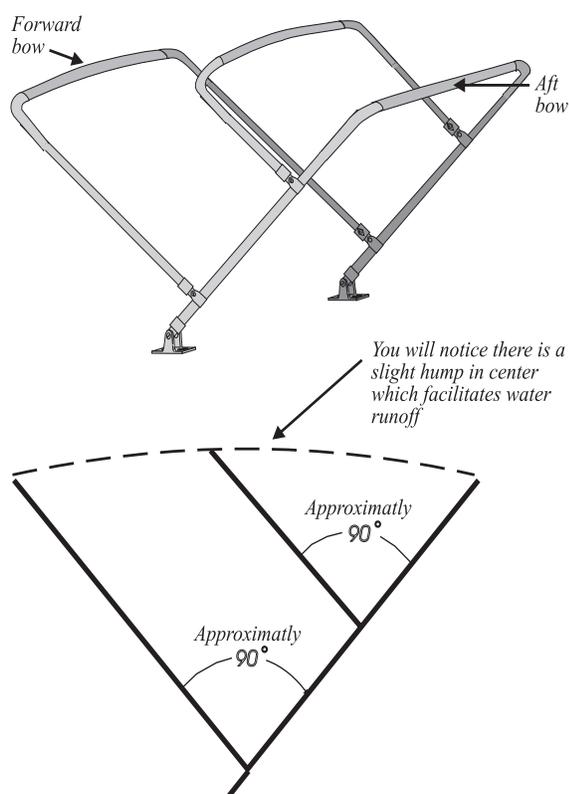
stead of a hem in order to simplify construction. Many professionals do the same. Indeed, the results of your effort will easily match the work of professional canvas shops. Building a Bimini is fun and satisfying. Let's go to it!

The Frame

Start by constructing the frame. The three bow Bimini we are going to discuss here requires nine tubing parts. Sailrite provides prebent 7/8" anodized aluminum or 1" stainless steel tubing.

Each complete bow assembly is made up of three parts: a center tube with a slight upward curve (called a crown) and two

Figure 1



"hockey stick" shaped pieces of tubing (called legs). These three tubing sections are joined together with short tubing "splines" that slide into the sections. (More about this latter.)

Two of these bows will have long legs and one will have somewhat shorter legs. The bows should be assembled as shown in Figure 1. The short bow should be secured to the aft long bow. This keeps the jaw up when folded aft. It should be mounted on two sliding jaws so that it supports the center of the Bimini. And it should be designed so that it folds neatly in between the other two bows so that the frame can be compactly stowed when not in use.

All fittings are illustrated in Figure 2. They are secured in place with set screws. This makes the assembly of the frame quite straightforward.

Before cutting any of the frame pieces,

make a trip to the boat and determine how high and how wide and how long the finished Bimini should be. This is also when you should decide where the mounting points of the support straps will be. I like to take the frame with me and tape it in place on the boat while making these measurements. You may want to wait to actually cut the frame in a more comfortable environment, but it helps to temporarily support the full size frame in place on the boat to approximate how it will look and feel when it is finally fitted. Ideally, the Bimini will permit one to stand in the cockpit and look out under the edge of the fabric without having to stoop. But be sure that the Bimini is not so tall that the free movement of the boom across the boat is inhibited. Also make sure the placement of the pivot point will not interfere with winch handles, fairleads etc.

When you are finished, you should have a measurement for the proper width of the frame at the base of the legs, for its height from the plane of the leg base to the plane of the fabric cover, and for the length of the cover from the front bow to the back bow measured at the center of these two bows.

Armed with these measurements, prepare a frame using two by fours. Place the frame side boards on center just the desired width of the bimini frame at its base. They should be about two feet longer than the overall length of the Bimini. Such a board frame is illustrated in Figure 3. If the Bimini uses side mounts instead of flat, mount a block of wood centered along each length of the wood frame or put the side rails on edge. Screw the mounting plates in place on the frame at the proper width (see Figure 4).

The prebent frames that Sailrite provides with bimini kits can be reduced in height and in width. Height changes are very easy to make — simply cut away any excess height from the base legs of the longest bow. Then

Figure 2

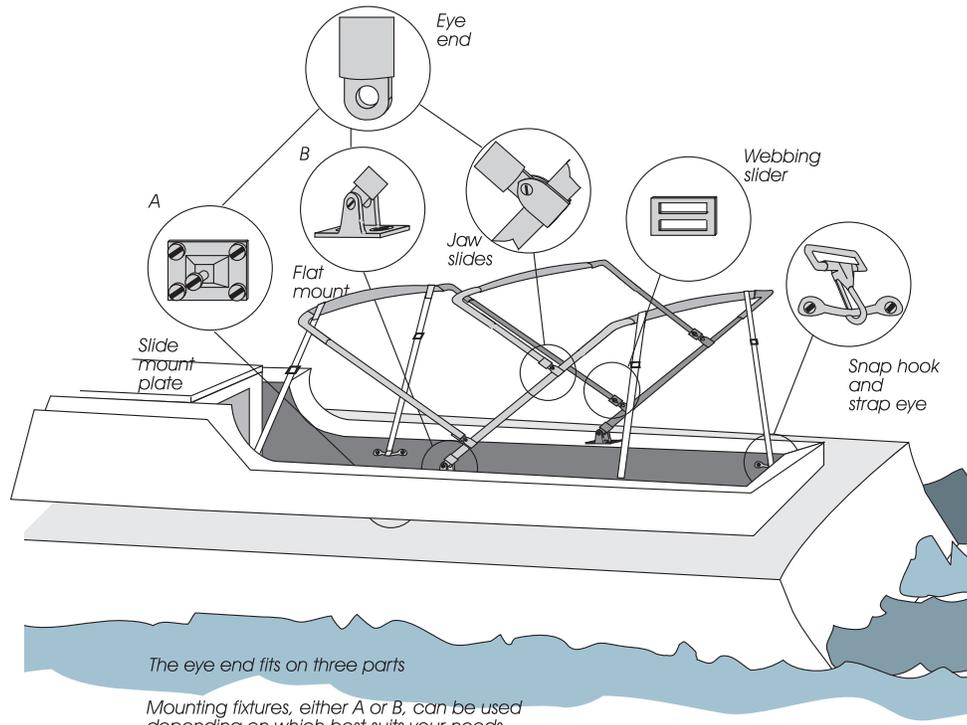


Figure 3

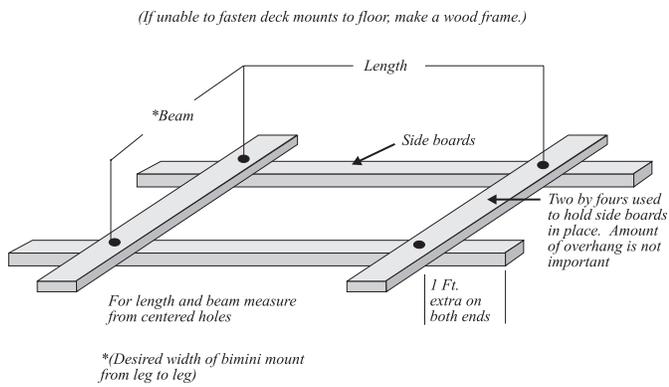
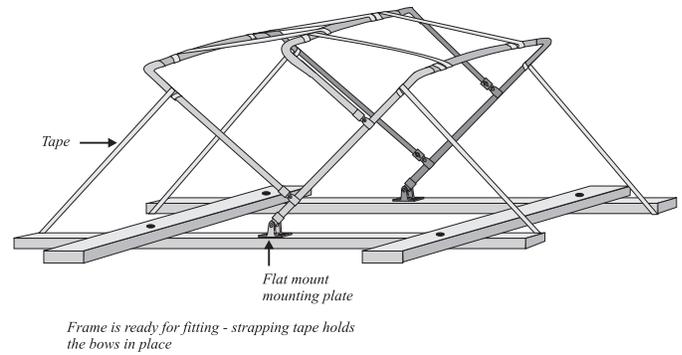


Figure 4



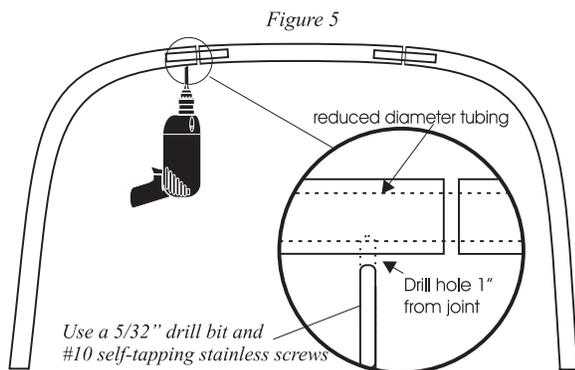
make sure that the shorter bows nest properly against the long one. This usually means cutting a similar length from their legs.

Changes in width are a bit more complicated. The crowned center bows on all legs should be cut an appropriate amount from each end in order to keep the crown properly centered. Follow the procedure below to determine the amount to cut:

1. Put the assembled bows flat on the floor and measure across their (uncut) base.
2. Add 6 inches to the desired width of the finished bimini bows if they are aluminum. Add 2 inches to this width if the bows are stainless. This means that the bows will be compressed (more or less depending upon whether aluminum or stainless is used). This compression will keep the frames from rattling in their mounts when under way with power.
3. Subtract the desired width (plus the 6 inch or 2 inch compression allowance above) from the actual width measured in step one.
4. Divide this result by 2 and cut that length from each end of the "crowned" tubing. When you reassemble the bows, they should measure either 6 or 2 inches wider than the desired width at the bottom of the legs.

When your frame is the desired width check to make sure that the center piece curve is "up". With each bow lying on a flat surface, lock the assemblies in place.

If the tubing is aluminum, self tapping screws are normal for this task. Use a 5/32nds inch drill bit to make pilot holes one inch or so from the joints where the frame pieces meet. Drill through both the frame



piece and the spline tubing. Drill up from the bottom of the frame so that, when the #10 self-tapping screw is inserted, its head will not abrade the fabric cover on the top surface of the frame (Figure 5). A center punch can be used to create a "dimple" to make drilling more accurate.

With stainless bows, self tapping screws sometimes break. We recommend that a #21 drill bit be used to open the hole and that the tubing be tapped. Use a 10-32 tap and, of course, a 10-32 stainless machine screw.

Install the fittings on the legs and assemble your frame to the mounting plates on the wooden frame. Use tape (filament strap-taping tape works very well) to support the frame at the proper spread and height (Figure 4). Tape the frame carefully so it is quite rigid. Double check your measurements making sure the fore and aft bow are at the appropriate height and that the center bow is slightly higher (3" or so) than the other two.

When the frame is installed, you may want to use blue Loctite® to keep the screws from working loose.

Making a Pattern

With your frame securely anchored and taped, the fabric cover can be patterned. We like to make patterns with basting tape and a light weight clear plastic material. Begin by applying filament tape to the surfaces of the bows that define the flat planes of the fabric cover (this means the top of the middle bow and the surfaces opposite the legs on the fore and aft bows). Now put basting tape on top of the filament tape. DO NOT put the basting tape directly on the frame since it is very hard to remove — the filament tape, on the other hand, can be peeled right away removing the basting tape at the same time.

Put a mark at the center of each bow. Now drape your pattern material over the



Figure 6

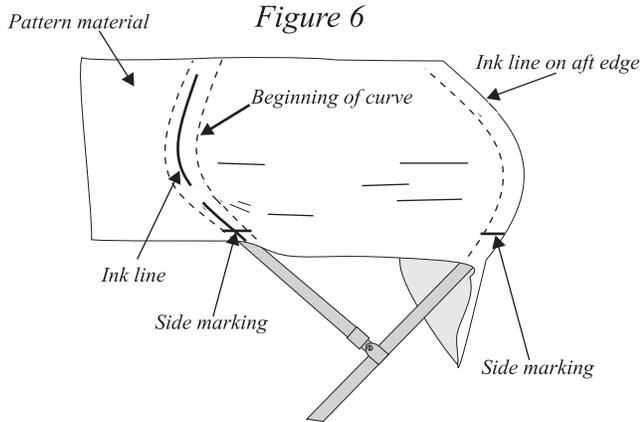
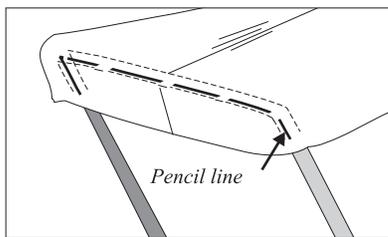


Figure 7



Mark along forward and aft bow.

exposed basting tape on two bows, i.e., over the forward and center bows or the aft and center bows. Then, starting at the center of each bow, smooth the pattern material down onto the basting tape working toward the outer edges.

Once you have the material as smooth as possible put a line on top of the middle bow and along the surface opposite the legs of the fore and aft bows. This line will define each pattern (Figure 7). With a three bow frame there will be

a forward and an aft pattern.

Mark the patterns at the bows on one side where the bimini cover should stop (See "Side marking" in Figure 6). It is important to keep the cover beyond the bend in the frame to prevent it from riding up over the curve. Measure up from the floor or the frame and transfer these marks to the other side of each bow. Do this for both patterns.

We like to raise the side marking at the middle bow about 3 inches. This gives the top a more graceful appearance. But it is normal to make the bottom edge of the cover straight from bow to bow. If there is a curve it should be an upward hollow to prevent flapping.

Before removing the pattern make sure each panel is labeled outside, inside, fore, aft, and center line.

Remove the pattern material. Add a 1/2-inch seam allowance to the forward and aft edges of each pattern. Connect your side marks with a straight line (or with a slight hollow as discussed above). Cut out the patterns. They should look somewhat as shown in Figure 8.

The Fabric Cover

Now lay the patterns on the bimini fabric. They should be oriented on the thread line of the fabric down its length.

With the fabric under your pattern (Figure 9) mark all the edges with chalk or pen or pencil. Cut the panels with a "hotknife" if possible (a soldering iron or gun works quite well) to prevent raveling. A scissors may also be used since all edges will be covered.

Label the cut fabric panels, fore, aft, inside, outside and center line as was done on the pattern material.

Should any portion of the pattern extend beyond the width of the 46 inch fabric (this may happen if the spread between any two bows is greater than 40 inches), fabric will need to be added to those areas. Cut this fabric from the scrap

Figure 8

*Cut lines for front and rear are dashed.
Cut lines for sides are solid.*

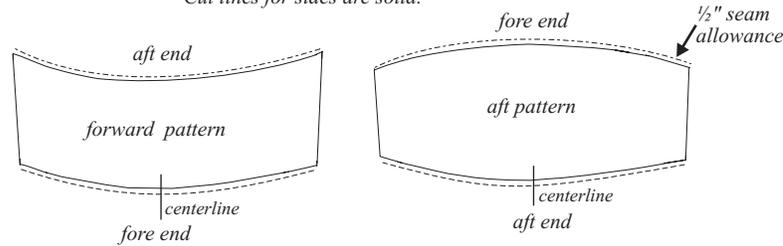
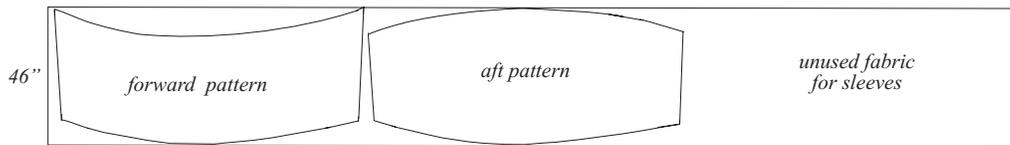


Figure 9

*Bimini Panels marked on
fabric blank*



created above and sew it to the appropriate areas. A simple overlap of 1/2-inch with two rows of stitching is all that is needed to join these pieces since they will be on the sides of the bimini. Use the longest straight stitch your machine will make since that reduces the natural tendency for the acrylic material to pucker as it is sewn.

Next cut the sleeves that are used to secure the cover to the frame. There will be two long sleeves along the forward and aft edges of the top. These sleeves should be cut from the unused portion of the cloth blank. They will be 5 inches wide and reproduce the curves found along the aft end of the aft bimini panel and the forward end of the forward bimini panel.

Place the aft end of the aft bimini panel over one of the long edges of the unused fabric so that its curve can be marked on the fabric and then move it up 5 inches and mark the curve onto the fabric again as shown in Figure 10. Now mark the corners of the sleeves so they will be about 1 1/2-inches short of the edges of the bimini panels on each side. This makes binding the outer edge of the bimini easier and it tends to give the finished side of the bimini a less constrained appearance than would be the case if the sleeves ran all the way

to the edge. Also place 6 match up marks on both the bimini panels and the sleeves—3 to each side of the center line (see Figure 10). Space these marks at equal intervals from the center line so they will be useful even though some sleeve layers will be turned end for end before attachment. These will insure that the sleeves can be sewn in place accurately along their length.

Create the forward sleeve in the same manner but use the forward end of this panel instead of the aft end to pattern this sleeve.

Cut out the sleeves with a hotknife or scissors. Mark the sleeves “inside” and “fore” or “aft” to guide work in subsequent steps.

Webbing straps will be used to pull forward and aft on the frame. These straps are run around the tubing usually just inside the curves on the bows. Mark 2 1/2-inch semicircles on the sleeves at each of these strap locations. Cut out these semicircles in the sleeves and cover their raw edges with binding tape to prevent raveling.

“Tails” are placed at the forward and aft ends of the cover. These are narrow strips of fabric that serve two functions. First, they tend to keep rain or spray from wicking back along the underside of the top to drip on those under-

Figure 10

Patterning the Aft Sleeve

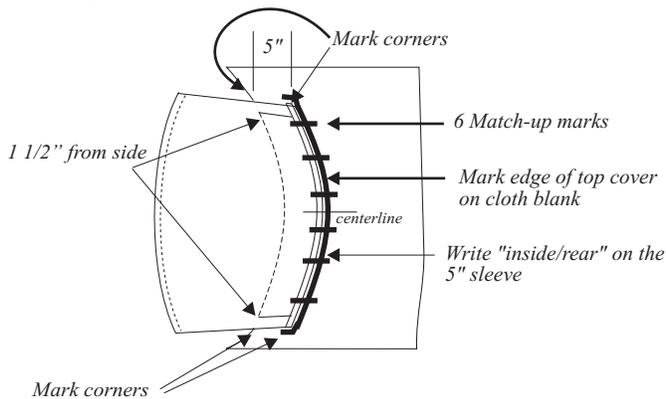


Figure 11

Patterning the Tail
(Make 2)

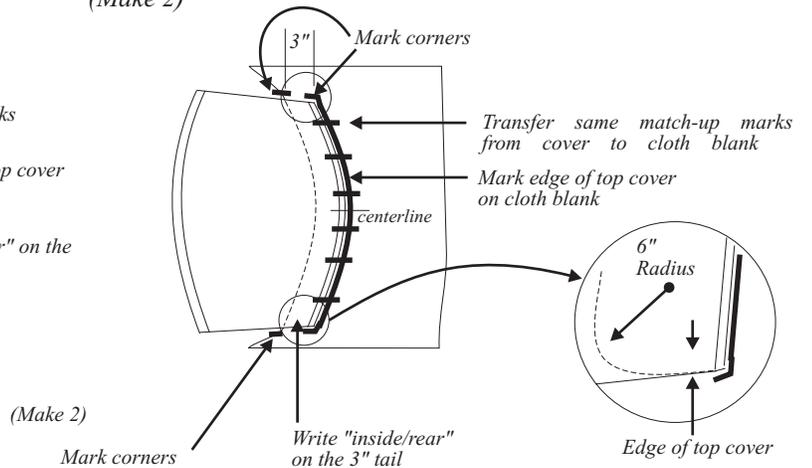
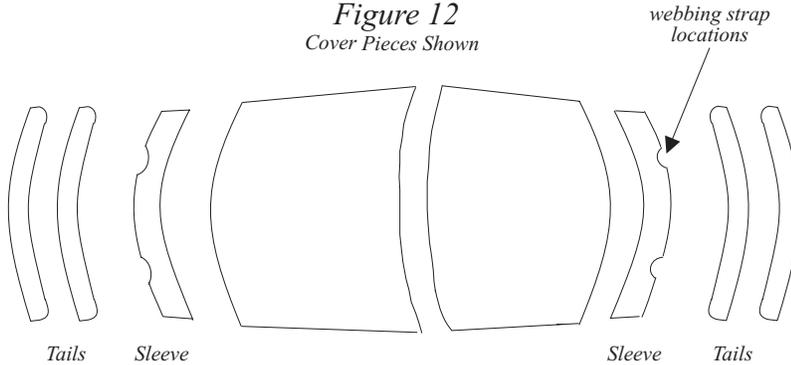


Figure 12
Cover Pieces Shown

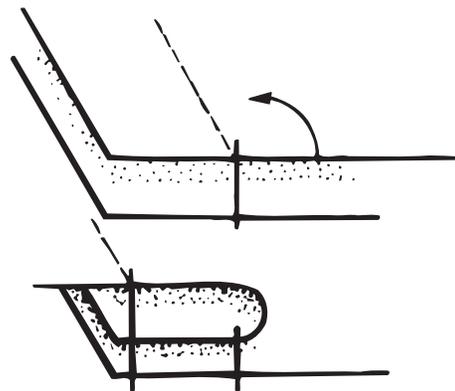


neath it. Second, they provide a handy flap to which additional covers or curtains can be attached.

Proceed just as you did when cutting the fore and aft sleeves except make the tails 3 inches wide (Figure 11). Be sure to transfer the same match up marks to the tails. And also mark the tails with the "inside" and "fore" or "aft" legend. When cutting the tails, make sure that they are long enough to reach the side edges of your top (unlike the sleeves which are intentionally short).

The inside corners of the tails should be rounded with a radius of about 6 inches (Figure 11). This radiused edge is for appearance only — it is the edge that will be outermost on the finished cover.

Figure 13
Semi-Flat Felled Seam



Duplicate each tail. The tails will be doubled to stiffen them. Figure 12 shows all the pieces you should have at this stage.

Sewing the Bimini

Join the panels that will make up the cover together with a blind or "semi-flat fold" seam (Figure 13). This seam is not so water-proof as a flat fold one, but these seams will run right over the bows so there will be no tendency for water to pool over them. Do your sewing with a row of the longest possible straight stitches.

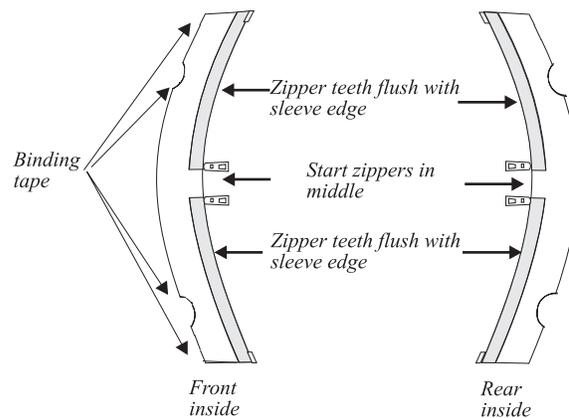
The semi-flat fold seam is formed by laying the fabric "topside" to "topside" with their edges flush and running a straight stitch just 1/2-inch inside those flush edges. Then the top panel is folded out and the 1/2-inch seam allowance is folded back against one or the other side where it is secured in place with a "topstitch" a row of straight stitches 1/4-inch or so from the fold in the joined pieces.

Joining these pieces will often require forcing a curve that goes one way back over a curve that goes the other way. Accuracy is very important so we suggest that double sided basting tape be used whenever possible. It may also be helpful to have a stapler handy to provide extra strength at crucial places — just be sure to remove the staples when sewing is complete. Just in case the basting does not hold, it is a good idea to start all sewing from the center of seams and work out to the edge of the assembly first one way then the other. If there is any inaccuracy with this procedure it will be limited to just half of the seam.

First sew together the "primary panels" that make up the bimini. After sewing these panels together they will no longer lay flat on the floor because of the shape imparted by the seam (or seams in the case of 4 bow biminis).

Next turn to the sleeves. Place a 1/2-inch hem along the inner edges of both sleeves.

Figure 14



Fold the hem toward the inside surface of the sleeves so they will be underneath when the sleeves are attached. These hems will traverse curves which may make relief cuts in those curved sections necessary to keep them flat. After the hem is sewn, cover the short length across the ends of the sleeves with binding tape to prevent raveling.

Secure two finished zippers to each sleeve along their inner and "inside" edges (Figure 14) so the zipper tapes will be inside the sleeve when it is secured to the underside of the top. We like to use two zippers so the cover can be zipped in place starting from the center and working outward toward each side. If they are too long simply cut the excess from the end that is last to close. Cut three or four teeth from the waste. Insert this short segment between the final few teeth. Then melt these teeth together to form an effective stop for the slider. Do this for both sides of the

zipper.

Separate each zipper before beginning the work. Either side, that is the one with the zipper tab or the one without, can be installed along the sleeve but be consistent with all four zippers (although this is a minor concern). Sew the zippers to the hem on the inside of the sleeve with the teeth flush to the hem on the edge so that the zipper teeth will be covered by the edge of the sleeve. The zippers should close last at the cover's outer edge. This puts the slight bump that the sliders create on the edge where it does not mar the smooth shape of the rest of the cover. Sew the zipper tapes to the sleeves with a row or two of straight stitches.

Staple or use basting tape to secure the two parts of the tails together. Make sure that the match up marks show on the inside (underside) of the tail assemblies.

One row of stitches will be used at the front and the back of the cover to attach the tail assemblies and the sleeve assemblies together with the primary fabric panels. Stack these pieces in preparation for this stitching as follows:

1. Start with the primary panels flat on the floor top side up.
2. Add the tails with their underside up (note that this will show the match up marks). The curves along the edge of the tails should be quite similar to the curve on the primary panels.
3. Then place the sleeves on top of the tails with the "inside" surface up (this is the side of the sleeves with the zipper tapes) and the fore and aft edges flush. Once again, the curves should match nicely and match up marks should be visible (Figure 15).

Baste or staple (or both) everything in place carefully. Sew along the fore and aft edges of the bimini securing all four layers together with a 1/2-inch seam allowance. Remove staples if there are any since they will rust badly if left in place. Open the sleeve and tail sections. With these sections held out of the way, topstitch the seam allowance to

Figure 15

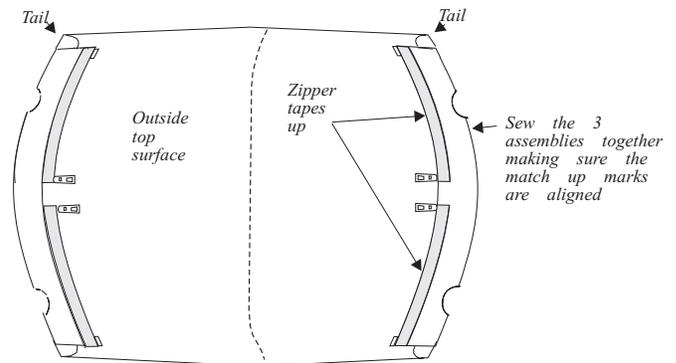
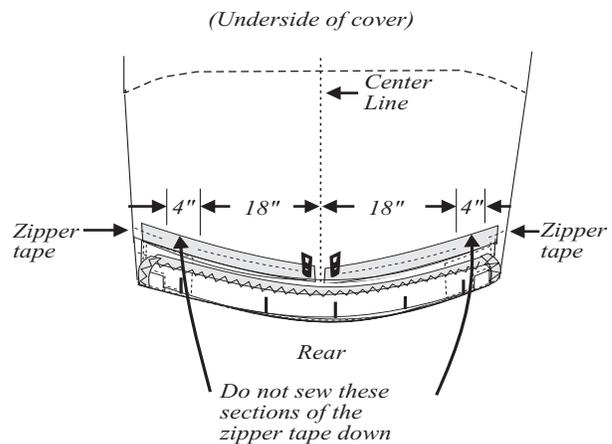


Figure 16



the primary panels in the cover. In other words, run a row of straight stitches about 1/4-inch or so from the initial stitch on the side of that stitch that is toward the center of the cover.

Return to the fore and aft sleeves. First join the zipper halves together if they are not already complete. Turn the sleeves under the rest of the cover so their inside surface is facing the underside of the cover. Mark the edge of the zipper tape on the cover with a pencil. It is enough to place a mark every three or four inches. Then duplicate those

marks one-half inch closer to the edge of the bimini. Use these new marks to position the zipper before sewing it. The slight "bubble" in the sleeve that results allows for the insertion of the frame tubing. Use basting tape to hold the free edge of the zipper tape flat against the cover. Then sew that edge of the zipper to the top with a single row of stitches. Keep the stitch as straight as possible since it will be visible on the top of the cover.

The sleeve on the bow that supports an intermediate bow (this would include both the sleeves in a four bow frame) should be sewn with two gaps in the stitching 2 to 4 inches wide 18 inches or so from the center line on each side. These gaps will be used as exit points for the two "thin" 1 inch webbing straps that run from the aft bow to the center bow to hold it in place (Figure 16). Reverse over the stitches next to these access slits to keep them from raveling.

Run a binding tape all round the cover including the tails. Binding tape is prefolded with a crease in its center so it can be sandwiched over the edge that is to be protected. Either a straight or a zigzag stitch can be used to hold it in place. When finished, all raw edges should be covered.

All that remains is the webbing straps. Four straps are used to support the Bimini. Two more are used from the "support" bow to the intermediate bow (plus 2 more in the case of a 4 bow frame) to hold them in position. These latter straps should be cut from 1 inch "thin" webbing 10 inches longer than twice the distance from the rear sleeve to the center bow. On one end of each strap, sew a 1 inch cam buckle into a small loop. Heat seal the other end so that it can be looped over the center bow and taken through the cam buckle for proper adjustment (Figure 17).

Fore & Aft Support Straps

There will be two forward and two aft

Figure 17
(There will be two of these assemblies)

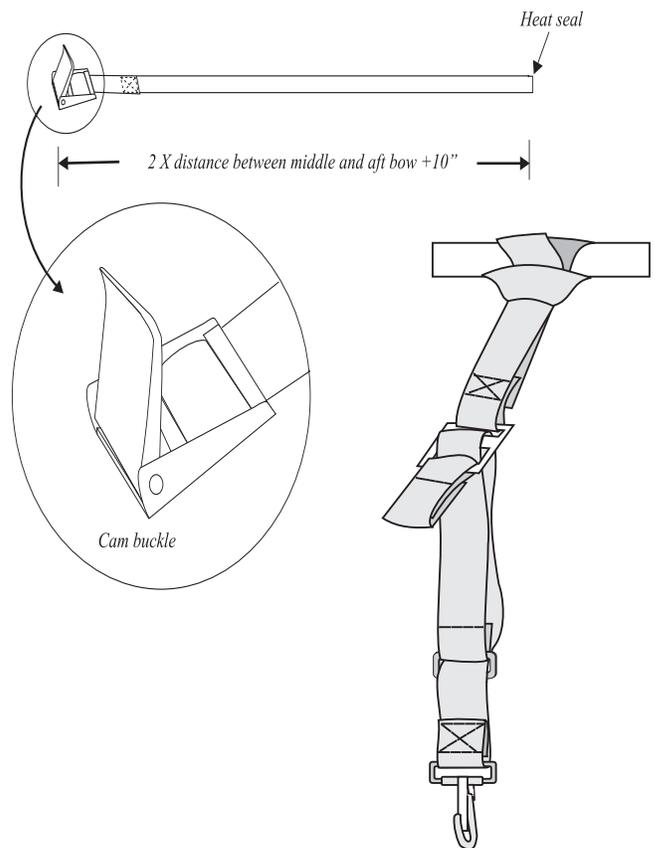


PHOTO 1

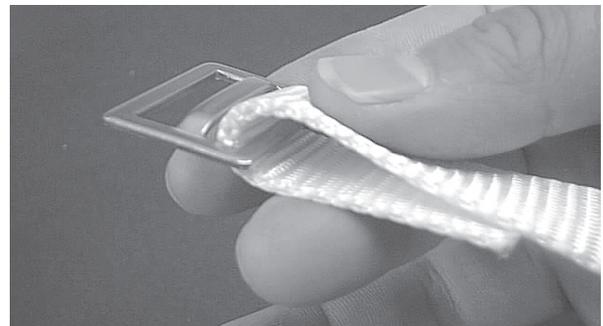
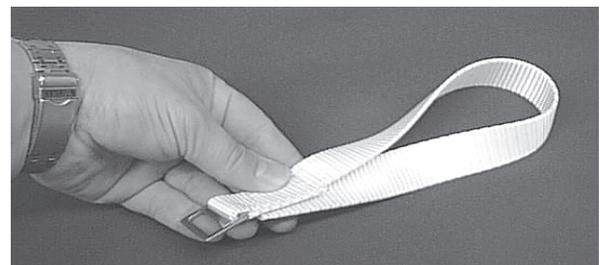


PHOTO 2



support straps. Build each one as follows. Cut two pieces (one 18 inches and the other 6 inches long) from the 1 inch "thick" nylon webbing. Use a hotknife or seal the ends with a soldering iron after cutting.

With the webbing slider facing up (see PHOTO 1), thread approximately 1 1/2" of one end of the 18 inch piece through the slider's larger opening. Permanently attach the 18" piece to the slider by sewing the webbing loop just created down against itself. (Straight stitches are suggested for all of the machine stitching on these straps.)

Take the free end of the webbing and put one twist in it so that it does not lie flat (see PHOTO 2). When this is done the webbing will appear to have an open collar on the end opposite the slider. (This twist is done in order to make the webbing lie flat when it is looped around the dodger frame.)

Bring the free end of the 18" webbing under the looped end and sew them together. There will be 3 thicknesses of webbing and they should be carefully secured using medium sized stitches and sewing a Box "X". Be sure when doing this to maintain the twist. (If your machine will not handle 3 layers of tubular webbing, pull the free end back to where the webbing is a single thickness and sew it in place.)

Now take the 6 inch piece of webbing and thread it through the small opening in the webbing slider. Secure it in place using the same Box "X" stitch described above except in this case a twist in the webbing is not needed. It should be approximately 2 inches in length when finished (PHOTO 3). This loop of webbing serves as a release pull only.

Cut another piece of the webbing to run through the webbing slider and down to the strap eye on the boat. Use the measurement from where the strap will attach around the frame to where it will snap to the strap eye for its length (add from 6 to 12 inches). Perma-

PHOTO 3

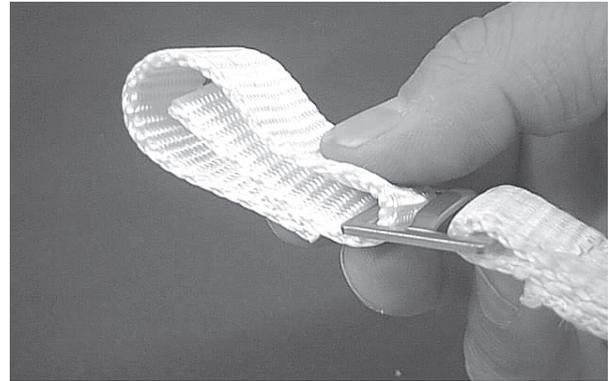


PHOTO 4

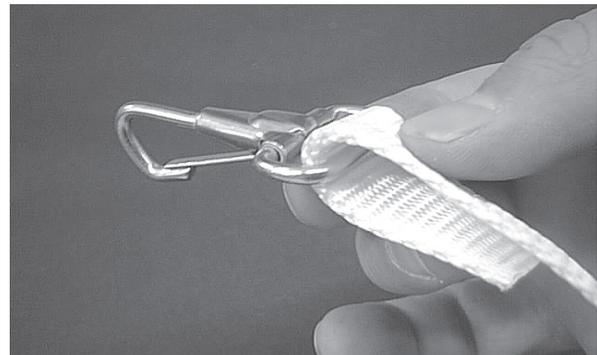
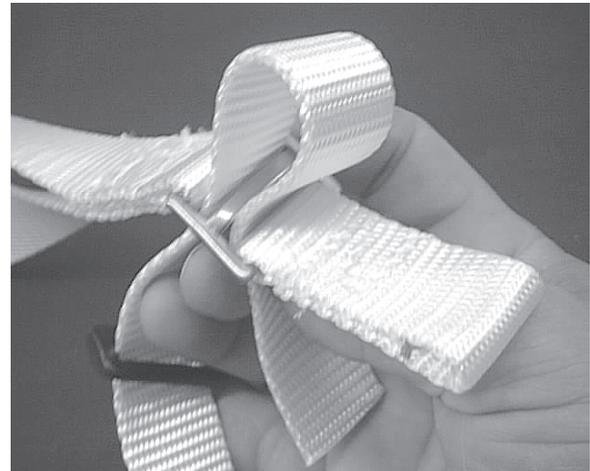


PHOTO 5



nently attach a snap hook to one end of this webbing by looping the webbing through the hook's rectangular opening and sewing the webbing down against itself using a "Box X" straight stitch (PHOTO 4).

Slide the square plastic loop-loc over the other "free" end and, then, loop the free end up from the bottom of the webbing slider through the large opening, over the slider's center divider and down through the slider's smaller opening (PHOTO 5).

This leaves the free end of the webbing on top of the strap (between the frame and strap eye) where it can be used to tighten the strap. To keep the strap from flapping sew the loose end to the loop-loc (PHOTO 6).

All that is left is to attach this webbing assembly to the frame. This is easily accomplished by holding the open collar of the twisted loop on the 18" piece slightly above the outer side of the frame. Now bring the snap end of the webbing strap up from behind the frame and passing it through the collar. Pull the snap end to snug it in place. The resulting knot will look something like the knot on a man's tie (PHOTO 7).

Tightening this webbing strap is simply a matter of pulling on the long tail of webbing held down by the small plastic loop-loc. Loosening the webbing strap is simply a matter of pulling up on the short loop created from the 6" piece of webbing. It works great!

Congratulations—your Bimini is finished!

If attaching the aft end of the bimini to the stern rail instead of to strap eyes on the deck, you can make attachment loops with a 12" piece of webbing and a D ring. To do so pass one end of the strap through the D ring, place a twist in it like in PHOTO 2 and sew it down to itself. Loop the strap around the stern rail and snap the snap hook to the D ring. (Materials for this method are not included in the kit.)

PHOTO 6

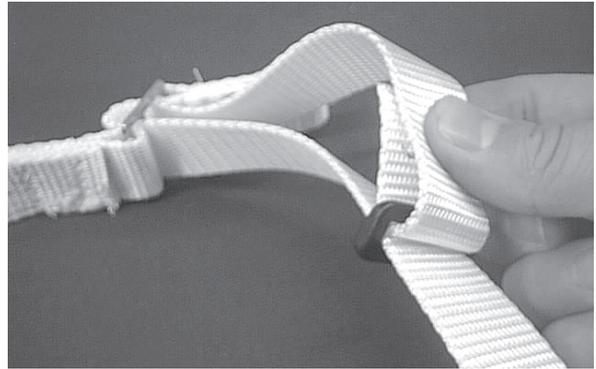
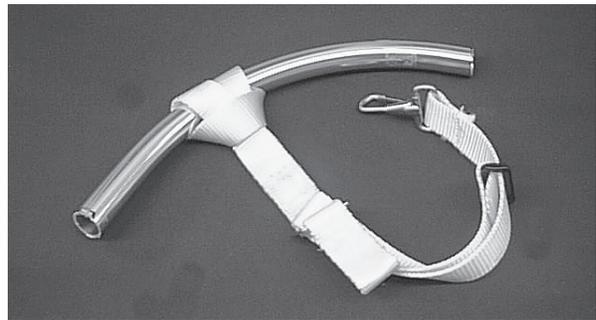


PHOTO 7



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ADDENDUMS

Creating an Opening for a Backstay

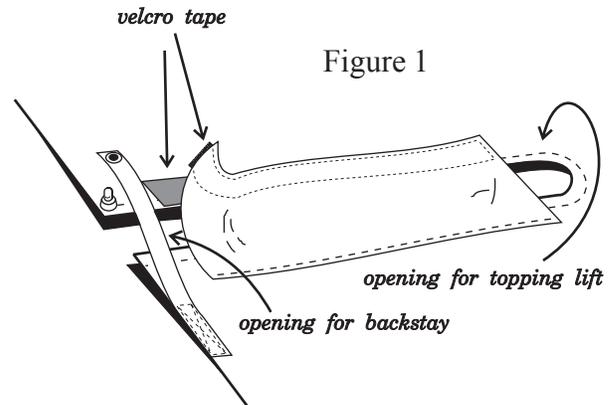
On some boats an opening is needed to accommodate a backstay that is very far forward. If an opening is needed in the aft edge, make a slit in the fabric after the aft sleeve and tail are complete. Cover the edges of the slit with a length of binding tape or leather being sure to maintain the sleeve opening (rip stitches locally if necessary in order to keep the binding continuous as much as possible).

If leaks are likely to be a problem, the slit can be closed off in one of two ways. A flap may be sewn to one side of the slit and a Velcro closure used to secure its other side. And, if necessary, a twist lock fastener and a tab can be added to securely link the ends of the slit together. See Figure 1.

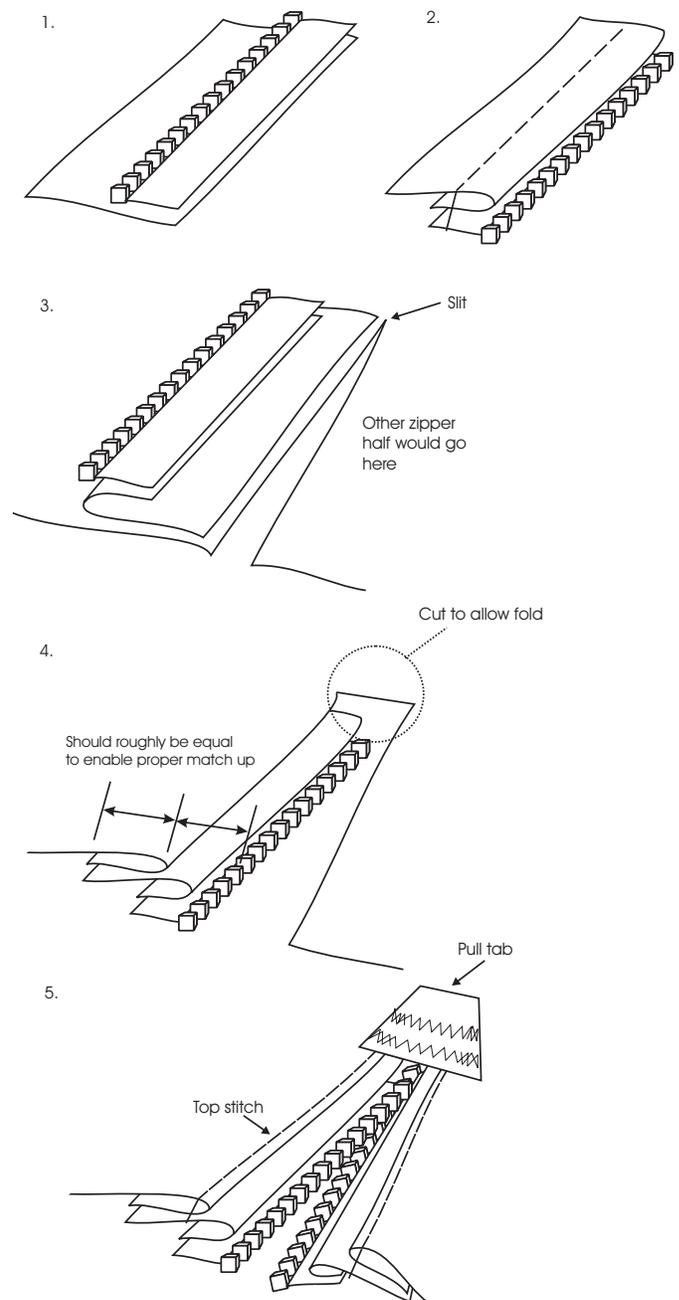
Or the slit can be closed off with a zipper. Since there is no extra material to provide for the zipper installation, we recommend cutting two 2-inch wide lengths of tape (any piece of fabric which is slit is called a tape) from the scrap bimini fabric. Make them three or four inches longer than the slits. This length can include the sleeve or not depending upon personal preference, but stitches in the sleeve assembly will have to be ripped for a few inches in order to secure the zipper tapes.

Attach a zipper half to one edge of one tape so the teeth face in and the zipper tape is flush with one long edge of the fabric tape (see step 1). Then fold the assembly over so the zipper teeth are even with the folded edge of the tape and sew this hem in place (see step 2). Do the same with the other zipper half. These tape assemblies, when complete, are attached to each side of the slit with the zipper teeth up and away from the slit edge — in other words, the tapes are sewn with their raw edges flush with the slit edges and the zipper teeth up (see step 3). Now, fold the tapes over and under so the zipper teeth are matched up opposite one another under the cover (see step 4). Before sewing, zip up the zipper and press the assembly flat. Place a topstitch through the final hems to hold them in place. At the apex of the slit a triangle of leather or vinyl or acrylic can be used to finish the cut and to provide a useful pull tab as well (see step 5).

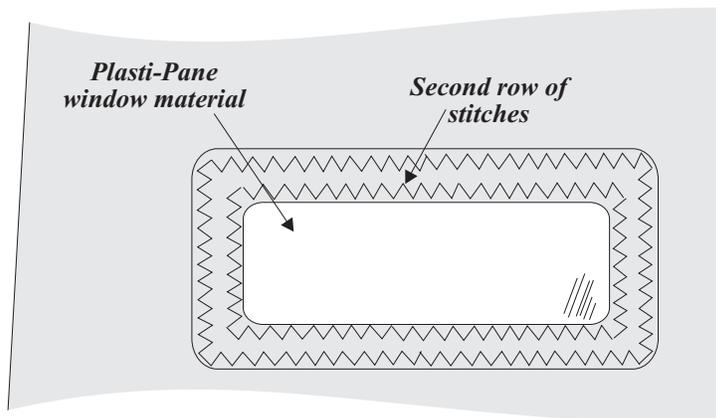
In some cases (especially with widely spaced double backstays), it may be better to cut openings into the sides of the finished Bimini top (parallel to the aft sleeve assembly). Because side openings are under stress they should be closed off with zippers not flaps. Start the zipper at the edge so that it closes last at the opening for the backstay.



Using Tapes to Cover Zipper Slits



Installing a Window in a Bimini Top



There are no hard and fast rules regarding either the proper size or the proper placement of windows in biminis. Use the window to check the trim of the main but keep it small enough so that the primary function of the bimini—the provision of shade is not impaired.

No attention need be given seam location when placing windows. Windows can be placed squarely over seams but, if they come in contact with the bimini frame, they will be subject to scorching and cracking and some form of protection will be necessary to insulate the window material from the hot metal.

Start your work by cutting the vinyl window material to whatever shape you desire. Now place strips of seamstik basting tape around the edges of the vinyl. Smooth the vinyl in place over the bimini fabric. It is a good idea to use staples at the four corners of the window to make sure that it will not break free when you start your sewing.

Sew all around the vinyl with a zigzag stitch between 1/8-inch to 3/16-inch long and wide. A zigzag stitch is desirable since it distributes stress over a broader area, but a straight stitch can be used. As you approach the staples at the corners, remove them.

When sewing around a window it is a good idea to break the task up. That is, don't sew all the way around in one pass. Rather sew down one side at a time and try to sew parallel sides consecutively. For example, roll the bimini from one edge and sew all along the closest window side. Finish the stitching with a short reverse stitch at the beginning and at the end. Then continue rolling the bimini to the other parallel window side and sew it. Now pull the bimini out from under the machine and roll it the other way sewing the last two parallel window sides. This technique makes it easier to keep the window from breaking loose from its basted position.

Now cut out the acrylic bimini fabric underneath the sewn window. To finish the raw edges simply sew acrylic binding tape around the edges with two rows of zigzag stitches (use the binding tape like a trim, i.e., sew it on flat versus sandwiching the edge). The lengthwise edges of this tape have been turned under providing a finished look that will not fray. If the window is rounded, it may be necessary to cut radius slits along the rounded edges so that they will fold under properly. Use seamstik basting tape to hold the binding tape in place until it is sewn.

Now flip the bimini over and sew the binding tape around the edges of the plastipane under the bimini and your bimini window is complete!