Before You Start:

DIY Challenge:
If you've never worked with epoxy and fiberglass, it can be a little scary but only up to the point when you actually begin to work with it. It's just fabric and a clear paint like liquid that sticks to things and helps make the fiberglass fabric turn clear. You are going to ruin your clothes, so wear crappy shirts and pants and make sure you can work in a big enough enclosed space like a closed garage or a basement to help keep dust movement down.

Prep is everything when it comes to fiberglass work. Your foam surfaces must be sanded smooth and vacuumed clean before beginning the epoxy and fiberglass coating. The smallest of dust particles will poke up through the fabric if not wiped clean. Pre-cut all your fabric to fit in layers like shown in the video. Protect your floors and work table with plastic tarp, and be prepared to work without interruptions the minute you mix the epoxy. You'll typically have between 45 minutes and an hour to get the liquid spread through the fabric before the epoxy starts to turn into a thicker unusable jelly like material.

Safety:
Fiberglass dust is pretty awful on your skin or worse, in your lungs. Epoxy is somewhat difficult to work with and requires protective equipment to handle properly. You'll also get benefit from using power tools to help you in the wood and panel prep, so please, please, please be sure to read all the usage and safety instructions for all the materials you use as well as all the tools you plan to use. Dust mask, latex gloves, eye protection and clothing protection are a minimum when working with fiberglass and epoxy. When doing the full board prep sanding, I'd also recommend wearing a full painters coverall with hood to protect your skin and clothes from contamination. Make sure your work area is ventilated. Some of the materials like the spray glue or acetone for clean up is flammable, other materials like some epoxy gives off gasses that need to be vented outside.

Dust in the Wind:
Not just a song, EPS foam and fiberglass dust from sanding tends to float everywhere. Be sure to wear your respirator, use a vacuum on your sander and/or employ a dust collector in your work area if you have one. Close off your work area to prevent the dust from wafting all over your house, use an air compressor to hose yourself off before leaving the shop. I also kept a change of clothes outside my shop door to change into in order to leave the fiberglass dust behind. It's also amazing how much foam dust winds up in your hair. Stay safe, stay happy by keeping that dust off your life partner's favorite chair.

Materials:

Fiberglass:
You will need enough 6 ounce tight/plain weave fiberglass to cover the length and width of the board plus the drop over the edge of the board, 3 times. For me, I ordered (2) lengths of 50 inch wide fabric, 12 feet long. 9 foot lengths would have been perfect, but were unavailable. The wide 50 inch width allowed me to cut that extra long strip of fabric into sections that gave me the added structural layer on top of the board.

Epoxy:
You must use marine grade epoxy with UV inhibitor for watercraft projects. Polyester resins melt the EPS foam, and cheaper craft epoxy isn't formulated for outdoor/water use. I bought a 1.5 gallon kit and there was some left over.

Cedar Stringer(s):
Cedar is a good wood for canoe and board applications. It's light, strong and resists water rot if ever wet. My design calls for (2) 1X6 stringers but the board will work with a single Cedar stringer down the center if you like. Adjust your foam cut widths accordingly.

Foam:
This stuff is usually called Styrofoam but that's a brand name. Your home center will refer to it as EPS foam or Polystyrene foam. The board calls for 4 inches of thickness, or two sheets of 2 inch EPS foam glued together.

Spray Adhesive:
I used 3M 78 spray adhesive for EPS foam. It works great but was almost $30 for a single can. If you find an alternative glue that doesn't melt the foam, go for it. It is a temporary hold until the fiberglass wraps the board.

Paint & Prep Materials:
Any good flat latex paint will stick to EPS foam. Make the board any color you like as the fiberglass will allow the color to show through. You'll need all the regular project materials like latex gloves, plastic tarps, sandpaper, 2" painters tape, epoxy spreader, foam roller and throw away paint brushes. You can reuse your spreaders and paint brushes if you immediately stick them a closed bucket of paint thinner or acetone to dissolve the epoxy.

Step By Step:

1

Foam:
With a table saw or a straight edge and circular saw, cut your foam strips in clean straight lines as wide as you need for your design. My project called for 2 stringers separated by a 5 ½ inch wide center section followed by 12 ½ inch wide outer sections. Total with the Cedar board widths, this gives you a 32 inch wide board blank. You may make your foam board wider or more narrow depending on your preference. Adjust cuts accordingly.
Remember that you will need (2) pieces of 2 inch foam to stack together for a 4 inch thick section.

2

Cedar:
Match the cut width of the board to the total foam thickness. My project is 4 inches thick and then so was the Cedar board width. I think a few holes on the boards will help with any internal out gassing on really hot days but all my large holes really didn't save all that much weight. Use your cedar boards to dictate what the profile shape of your board will look like. Taper the front drop like in the video and round off the back ends of the boards.

3

Glue:
Spray glue your foam blocks together for that 4 inch thickness. Take care to square them up and make the edges flat so they match up well to the next block at the next glue step. Glue your shaped Cedar stringers to the foam blocks and then glue the entire set of foam blocks together to give you your full sized rectangular board blank.

4

Measure / Plot:
Use the taper measurements on the earlier page to plot your curve points on the board. The back of the board will have a 20 inch flat area to help stabilize the board on the water, while the front of the board will taper up for a more narrow width. Use a thin piece of wood, or plastic or cardboard to help you make a smooth curve between the plotted points and hold the curved material in place with tape and weights. With the curved material touching the plotted points on the board, draw your cut line using the curved material as your ruler. It should be a smooth curve on both sides of the board, front and back.

5

Cut:
Using a hand saw, cut along your plotted lines staying on the outside of the line. The cuts will be jagged but that is perfectly fine. Smaller straight cuts will get you around the curved sections. Once the outer perimeter is cut to shape, cut your front board taper using the trimmed Cedar stringers as your guide. See the video for this step on trimming our the front of the board. Take care not to cut foam deeper than the thickness of the boards.

Step By Step:

6

Sand, Sand, Sand:
Take care using power sanders. It's way too easy to blast through foam and take away too much material. They help to smooth out the board edges and get you to a better looking curve, but the top and bottom of the board as well as the outer curved edges of the board should be sanded by hand. See the useful tools I made in the video for more detail. Wear a dust mask at all times and get the surfaces smooth and flowing to match the overall curved design of the board. Use vacuum attachments to the sander to remove fiberglass dust. Wear a painters body suit for added skin protection.

7

Paint:
Protect the wood if you prefer to see the wood by covering the stringers with painters tape. Otherwise paint the entire board in whatever flat latex color you choose. If you like lighter colors with accented board ends, tape off the ends to help give you a clean line as you paint that accent color. ***GRAPHICS:*** The white paper printed graphics only really work well against a white painted background. The white paper tends to match the paint and the graphics blends into the design. Unless you can cut the entire graphic out from paper that is.

8

Sand the Dry Paint:
Seems weird I know, but fresh paint leaves you a spiked up little texture that doesn't work too well with fiberglass. Use a fine grit sandpaper like 400 to lightly knock down the surface and get rid of any rough imperfections. If you run your fingers over a freshly painted board, you will feel what I mean. Use a compressor to clean the dust away.

9

Prep the Fiberglass:
Bottom first. Wearing gloves and a mask, lay out the fabric on a clean board surface and leave enough fabric to just wrap over the curved edge of the board without extending on top of the other side. See the video for those trim cuts. Sharp scissors help to trim that fabric around the edges of the board, front and back. At the corners, make additional vertical cuts from the outer edge of the fabric towards the top of the flat board surface. Make those vertical cuts about every 2 to 3 inches apart on both sides of the board corner. These relief cuts will help you to wrap and overlap that fabric with epoxy so that the material doesn't bunch up in those corners. Your vertical cuts might extend 6 to 8 inches or more on both sides of the corner and that's OK. During the epoxy process, if the material continued to bunch up, we can make added vertical relief cuts as needed to help the fiberglass lay flat as it wraps those curves.

Leave the fiberglass positioned and aligned flat on the board for the next step...

Step By Step:

10

It's Bottom Epoxy Time:
Elevate the board on wood planks or boxes or working stands so that the board edges are well off the work table. You'll need to get to the underside as you finish the fiberglass wrap over the edges.

Wear your respirator and latex gloves. Fold over half of the fabric in preparation of doing one half of the board at a time. Follow your epoxy instructions for the proper mix ratio and stirring instructions to ensure a proper mix of hardener. You'll need about 28 to 30 ounces of mixed epoxy for each side of the board. Scrape the sides of your clean container and mixing stick frequently to make sure all the chemicals are off the bottom and sides and mixed well. Pour out a little epoxy at a time and with a spreader, work the epoxy across the entire half of the board, filling in those time little gaps in the foam. With a brush, coat the sides of the board with epoxy.

Fold the fiberglass back over to lay flat on the spread epoxy. It will immediately stick so lay it as flat on the surface as you can. Work the fabric with your hands and spreader, pulling the fabric towards the edges and corners making it flat on the surface. When that half of the board is laid out flat, quickly pull back the fabric from the dry side and repeat the coating steps there. Spread the fabric once again out towards the edges making the fabric lay flat on the thin layer of epoxy.

Evenly distribute the rest of the epoxy in the container across the whole board and work the epoxy into the fabric quickly, until the white fabric turns clear. At the edges and corners, wrap the fabric around the edges and fold over the cut corners on top of one another until the wet fabric is hugging the foam.

If you run out of epoxy and some spots of the fabric remain dry with white patches, mix up another small batch of epoxy to help you saturate the fiberglass. Continue working the spreader and paint brush into the fabric until it is completely saturated.

NOTE: It takes some effort and repetitive scrapes or passes with the brush to work the epoxy into the fabric. It's not you. It's sometimes hard to wet out fiberglass. You saw me in the video working one corner several times to get the fabric to the point where it was completely soaked through. It just takes the repetitive effort to make it right. Sometimes two people help to work the fabric quickly. My son helped me on my Cedar canoe build as we worked the epoxy into the fabric together.

Once the bottom of the board starts to look good, go back over the edges and the underside of the board (this means the unfinished top) so that any epoxy drips are brushed smooth around the edge and the underside.

Step By Step:

11

It's Top Epoxy Time:
It may take 24 hours or more before the first epoxy coat is completely hardened. Don't rush this step. The epoxy needs to be fully cured before we flip it over. Okay, so flip it over!

You may need to do some very light sanding on the board edges if any epoxy drips or loose fiberglass fibers are poking up from those flat surfaces. BE CAREFUL not to sand through the fiberglass or epoxy into the foam here. You'll need to stop and fill in any foam damage before proceeding to the top finishing. Step 11 is a repeat of step 9 and 10 where you clean the surface one last time, lay out the fabric and prepare to work the epoxy, except…

Graphics go on first. If you prefer to add any paper graphics to the board, they need to be positioned first. Second, We will be adding another layer of fabric to the board top. The first layer will be smaller, cut to fit just inside the top flat dimensions of the board and staying away from the rounded edges. The final top layer will be cut just like the bottom where the length and width will wrap over the edges of the board.

Cut and position the smaller piece(s) of fabric on the board, centered in the middle of the board, away from the edges. Fold the fabric up and away from where you intend to add graphics. Mix up another similar batch of epoxy, the same amount you needed for the bottom of the board. Mix it well. Brush on a thin layer of epoxy on the board where the graphics will reside. Place the paper down onto the wet board, printed side up.

Roll out more epoxy over that half of the board, filling in those little nooks and crannies and fold the fabric back over the board and graphics. Repeat the coating process on the other side of the board and saturate the smaller layer of fiberglass against the painted foam. Once this first layer of glass is clear, lay out the larger, second layer of fiberglass on top. Spread the epoxy evenly across the top and work the liquid into the fabric again pulling the fabric out flat towards the edges and corners. Make another smaller batch of epoxy if needed to complete the fabric saturation. Brush any of the globs of epoxy away from the edges and underside, this will save you final sanding time. Any extra epoxy can be spread evenly on top, avoid the sides.

Wait patiently for the plastic to harden. Kick back. Relax. Throw something on the grill. Hard part is over.

Step By Step:

12

Sanding? I Hate Sanding:

The hard part is done, but the really crappy part is just beginning.

The fully cured board now needs to be sanded smooth, or as smoothly as you can get it without burning through the fiberglass and digging into the foam. The goal here is to remove all the loose fiberglass hairs, visible fabric edges and epoxy drips that will clearly look like imperfections on a finished board.

GO SLOW with electric sanders and don't get too aggressive. Stick with higher grit sand papers like 220 to reduce the risk of blasting through all your hard fiberglass work.

The surface doesn't need to be perfect or glossy here. We are only trying to rough up the epoxy so that the finish layer will bond to the previous layer. Bumps and loose fibers need to be removed and the general shape of the board needs to look smooth. The final coats of epoxy will gloss over those tiny imperfections and leave a smooth coat behind, this is why the sanding prep is important here.

BEFORE YOU BEGIN: I'd highly recommend a full painter's body suit for this finish power sanding step. Dust protection is huge here, as is the ability to vacuum away any sanded dust. Stay safe, sand carefully. Once the entire board is feeling smooth to the touch, and by that I mean your hands and fingers even under latex gloves will be the best indicator on surface imperfections, but when everything is "feeling" smooth, you are good to proceed to the next finish step. The sanded board needs to be vacuumed off and wiped down to remove any dust,

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Painter's Tape:

2 inch wide painters tape needs to be attached at the midpoint of the board's outer edges, all the way around the board. Press the tape to the epoxy all around the tape edge to make sure it sticks. This will give you a clean peel-away edge on the board, preventing any drips of epoxy from running down the sides of the board.

After step 14, the finish coat, you will be removing the tape slowly when the epoxy begins to turn to a jelly consistency, but before it completely hardens. More on this later.

Step By Step:

14

The Epoxy Final Coat:

Sometimes referred to as the “Hot Coat”, this will be the thickening layer of epoxy that completely covers all those little fabric and board imperfections.

I start with the top of the board first because I want to make sure the finish on top is as perfect as I can make it, and any errant drips of epoxy (hopefully none with the tape) will be on the bottom of the board for an additional sanding step. The top should remain clear and glossy when done. It takes far less epoxy for this coat as the fabric won’t be absorbing the bulk of your mix. I estimate for these board dimensions, I used about 20 to 22 ounces of mixed epoxy for this gloss coat. Evenly distribute the epoxy over the board and use another skinny foam roller to roll out the mix to a clear gloss finish over the entire board. The final step is to brush the epoxy down over the edges, taking care not to bring too much with your brush stroke. The goal is to evenly coat the sides without leaving too much epoxy on the outer edge, with a chance to drip off the tape.

With a fine bristle paint brush, run the tips of the brush in long even strokes down the length of the board (as shown in the video) to leave one last even distribution of the epoxy. It will lay out flat once done and highly glossy. If the board appears too dry, mix another little batch of epoxy to help achieve a “wet look” on the surface of the board.

About 4-6 hours into dry time, check the consistency of the epoxy on the painters take. Once it feels more like a jelly than a thick liquid, it’s time to peel away the painter’s tape. Wait until the epoxy reaches this state before peeling the tape, otherwise additional drips may fall onto your smooth finish.

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Wait, Flip, Repeat:

Try to keep the board away from breezes and the chance for dust to land on your glossy board. Let the epoxy fully harden before flipping it over to the bottom. Apply a new layer of tape down from the new tape edge you’ve just created for the top. Match the lines of the tape to that epoxy line. Press in the tape to adhere to the board edge.

Mix your epoxy and lay a smooth coat over the bottom of the board just as you did in step 14. Again before the epoxy completely hardens, about 4 – 6 hours into dry time, check the consistency of the epoxy. When if reacts like a jelly (no longer runny), peel the tape off to give you a finished edge.

Step By Step:

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Wrap it Up:

You may not need any additional at all. My board has a couple barely noticeable specs of dust that landed, and one small clump of fiberglass “hairs” that somehow fell off my brush, but you could barely feel them on the board. I chose to leave the finish as is.

Other board builders will run through another sanding and epoxy coating step, followed by 600 or higher grit wet sanding followed by a long series of buffing compounds over the board surfaces. The finish looks beautiful until you scratch the bottom on the sand at the beach during your first launch (like I did). You choose how far you want to go with your gloss finish.

Accessories:
I really like this rubberized foam matting you can get for watercraft. It grips your feet and adds some color and style to the board. I like my little diamond pattern! It’s not a requirement for this project but it was cool..

The board leash plug and ankle leash is recommended as it allows you connect to the board and keep it from floating away if you dump off the board. Easy to drill in a hole into your finished board and attach the plug with some epoxy. You may need some reinforcement to hold the plug firm since EPS foam isn’t that strong. If you follow my build, I added a piece of Cedar epoxied to the stringers to support the plug.

Vent plugs: You also need to install 1 or 2 vent plugs into the board to allow internal pressure to “vent out” from the inside of the board during hot days. These don’t require a lot of reinforcement as they sit flush with the board surface and simply let gasses vent from the board. These plugs are drilled in and epoxied into place and relieve that pressure internally, which is the root cause of fiberglass de-lamination from the foam if the pressure gets too high.

SHOW ME: If you do take on this project and make your own board, let me know in the video comments! We can find a way to exchange pictures and I can feature it in the community section of our channel!

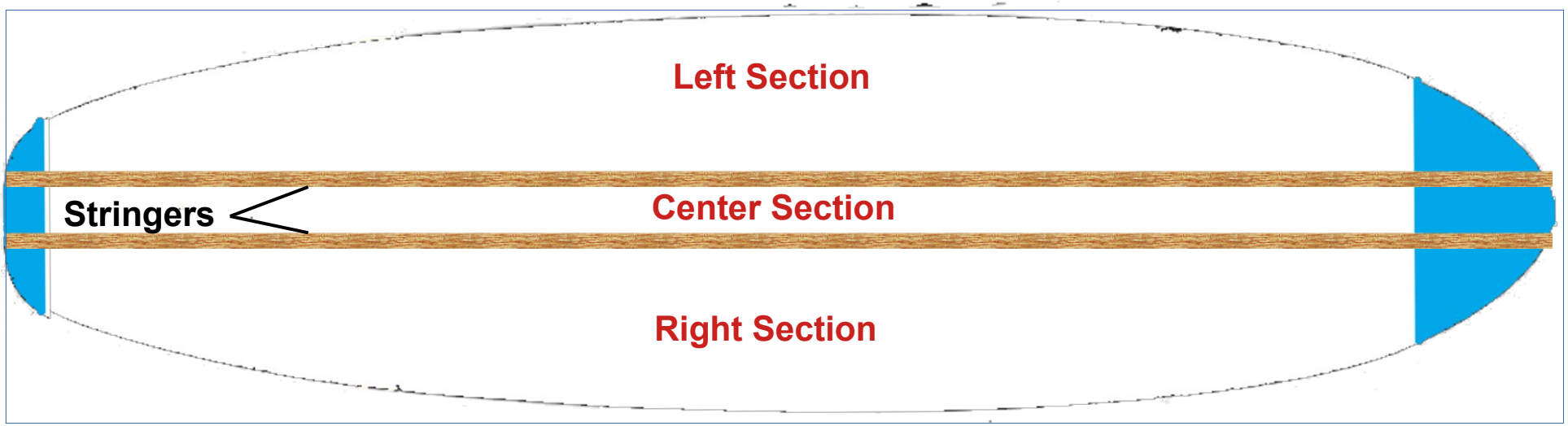
I wish you the best on your project!
Mark – The Family Woodworker

EPS Foam and Stringer Cut Measurements

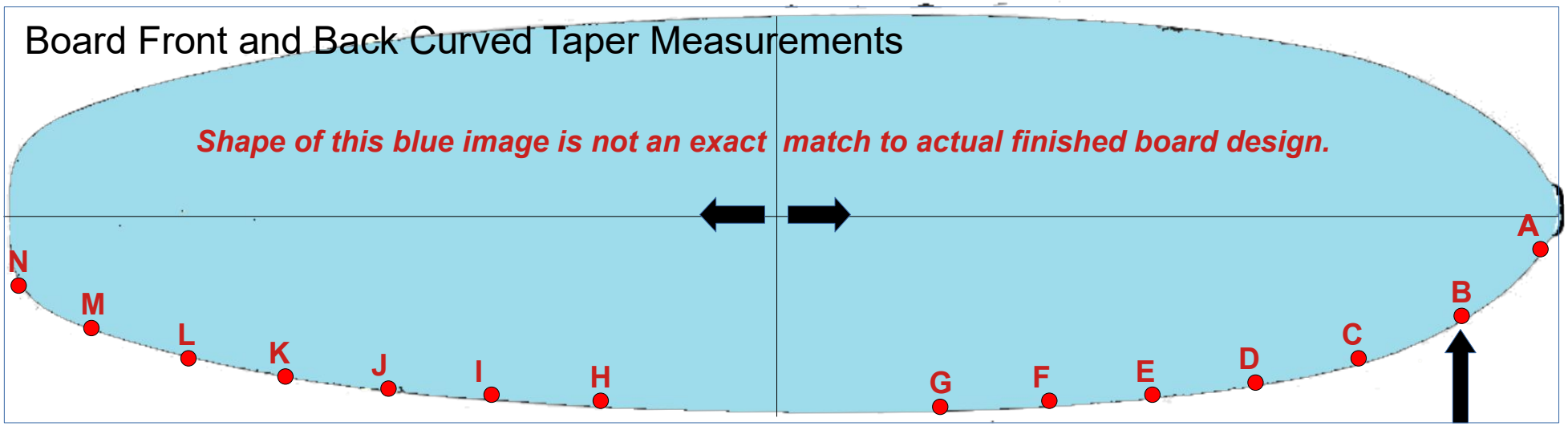
You can make this board from (2) sheets of 2 inch thick 4X8 foot EPS foam normally used for building insulation. It is also otherwise known as the common brand name; Styrofoam. The sheets will be protected by a thin plastic vapor barrier on both sides which must be removed in order for the foam to “breathe” and for the paint and epoxy to adhere. EPS foam is fragile and will flake off or break easily after the plastic barrier is removed. Take some care when handling to minimize the “foam scars” on the surface, though these can be repaired with epoxy or other filler.

Stringers: Some board designs don’t use stringers at all, but then require more fiberglass to stiffen what would otherwise be a fragile and floppy block of foam. ¾” Cedar is lightweight, rigid and solves the “bendy” problem but then requires more work to cut and piece the board together. Total width of the board after assembly: 32 inches. I am at my core a woodworker and love making watercraft… so including natural wood was a straight up done deal.

Left Section: 2 layers of 2” EPS Foam @ 96 inches long X 12 ½ inches wide
Center Section: 2 layers of 2” EPS Foam @ 96 inches long X 5 ½ inches wide
Right Section: 2 layers of 2” EPS Foam @ 96 inches long X 12 ½ inches wide
Stringers: (2) ¾ inch thick Cedar boards – 4 inches wide X 96 inches long



Board Front and Back Curved Taper Measurements



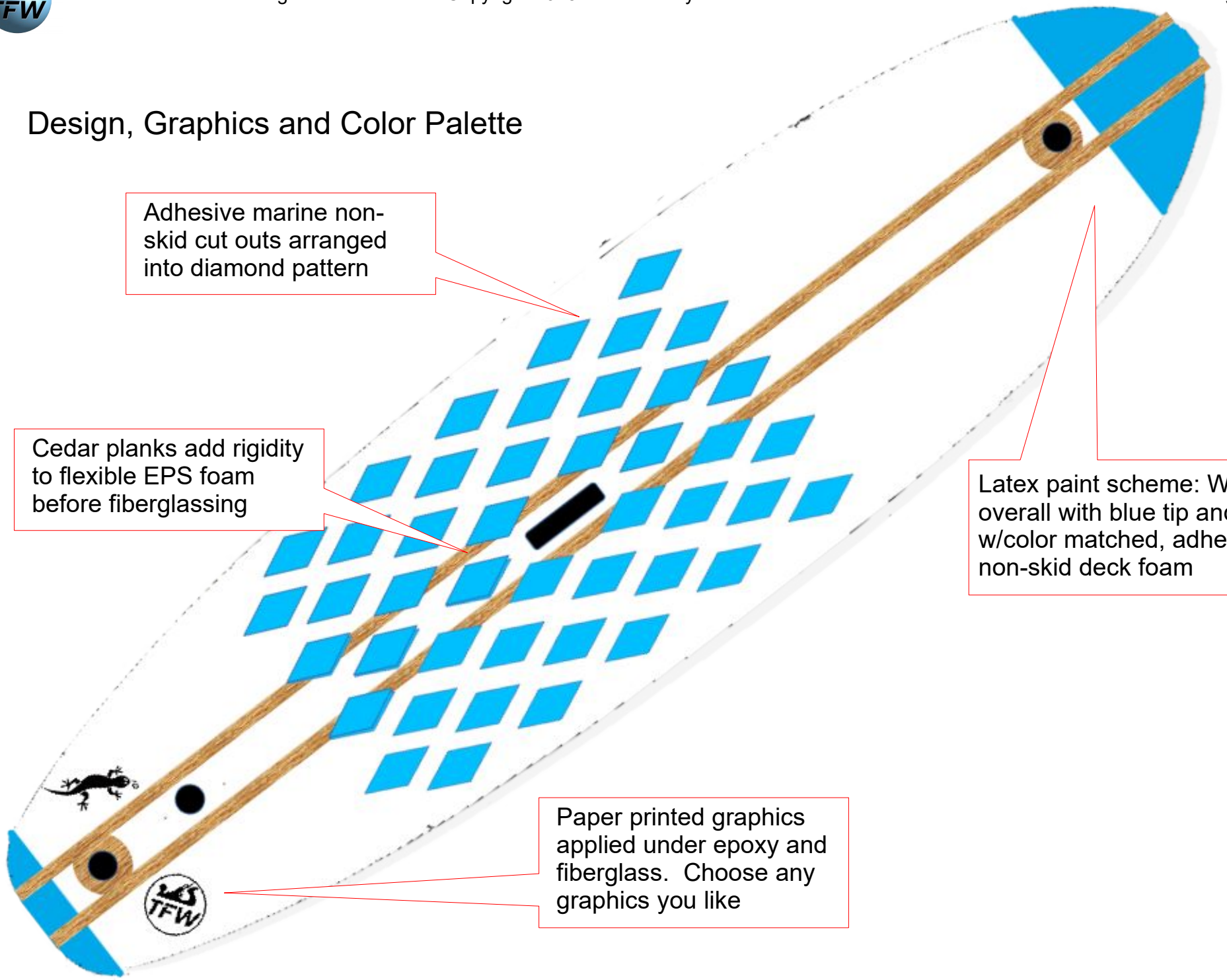
Plotted points for the curve are shown first as the distance away from the center line of the board, and then the measurement away from the long straight edge of the foam block. Repeat markings on the opposite side for matching rounded tapers. Perform this curve plotting only after the entire rectangular block is glued together as a single piece.

NOTE:

To assist you with drawing a natural curve between the points on the board, use a thin piece of wood or cardboard bent and held in place with painters tape while you draw your cut line. See the video for the steps I used. The drawn line doesn't have to be perfect as you will be sanding your cut foam to a smooth finished curve before applying the fiberglass.

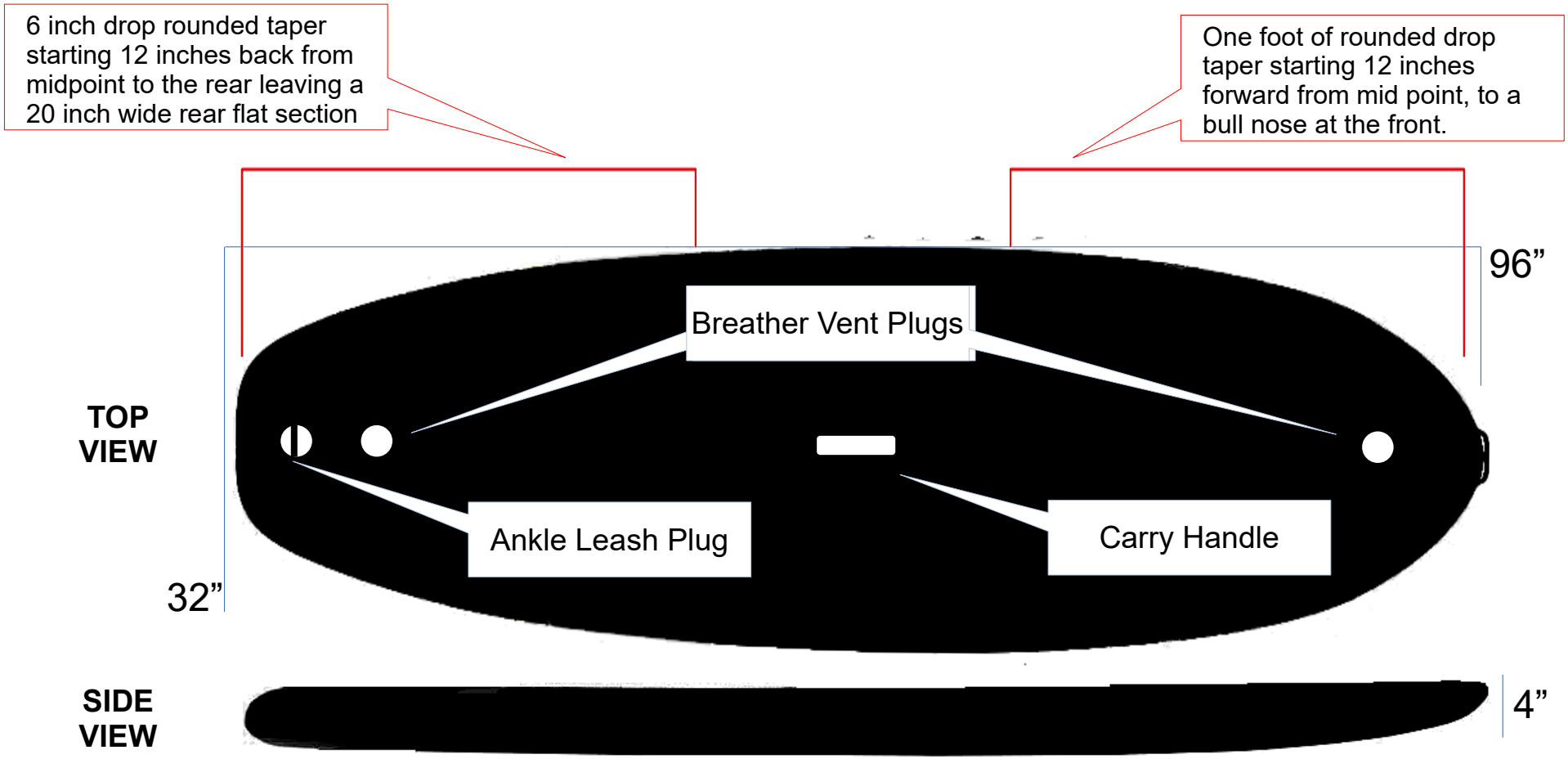
Measurement	From Center Line		From Outer Edge
Point A:	48”		11”
Point B:	42”		7”
Point C:	36”		4”
Point D:	30”	FRONT	2 ¼”
Point E:	24”		1 ¼”
Point F:	18”		½”
Point G:	12”		¼”
Point H:	12”		¼”
Point I:	18”		½”
Point J:	24”		¾”
Point K:	30”	BACK	1 ½”
Point L:	36”		2 3/8”
Point M:	42”		4”
Point N:	48”		6”

Design, Graphics and Color Palette



SPECIFICATIONS: Foamie + Cedar + Fiberglass Paddleboard

- 96 inches long – (2 sheets of white 2” thick EPS foam @ 4 X 8’) - the plastic vapor barriers must be removed
- 4 inches thick (2 foam layers, bonded with 3M-78 Spray Adhesive for EPS foam)
- 2 inch rounded taper up from bottom to nose starting at the bottom 10 inches from nose.
- (2) 8 foot lengths of 1x6 dry & clear cedar for center board stiffening (holes drilled for weight reduction and out-gassing)
- (2) breather hole plugs (one-way vapor out gassing) one front and one back of the board
- 6 ounce plain weave fiberglass on both sides with UV stabilized marine epoxy
- Approximate cubic inches of buoyancy = 11,000 @ .036 pounds supported per cubic inch = 375 to 390 pounds max capacity



Paper Graphics Starter Set