INSTALLATION INSTRUCTIONS

Required equipment

Before beginning the install process, ensure the following equipment is easily accessed.

1/ Routing Jig
2/ FCS II fin plugs
3/ Fin cavity stickers
4/ Router with recommended 2 flute cutting bit
5/ FCS II Dummy fins
6/ Scissors
7/ Resin mixing container
8/ MEKP Catalyst (for polyester resin)
9/ Brushes (1/2 or 3/4” recommended)
10/ Polyester resin or Epoxy resin (2 part)
11/ Gloves
12/ Resin mixing sticks
13/ Cabosil or FCS powder

WARNING: *Use polyester or epoxy resin for polyurethane foam blanks. For EPS blanks use Epoxy resin. Failure to do so will result in a damaged blank.*

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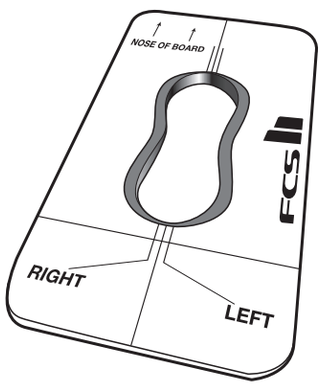

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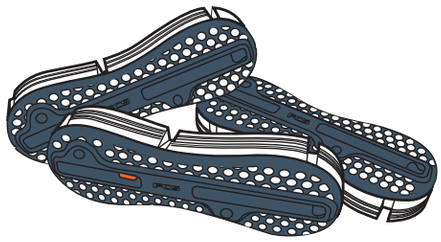

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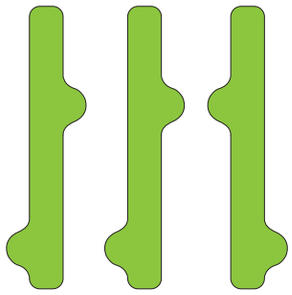

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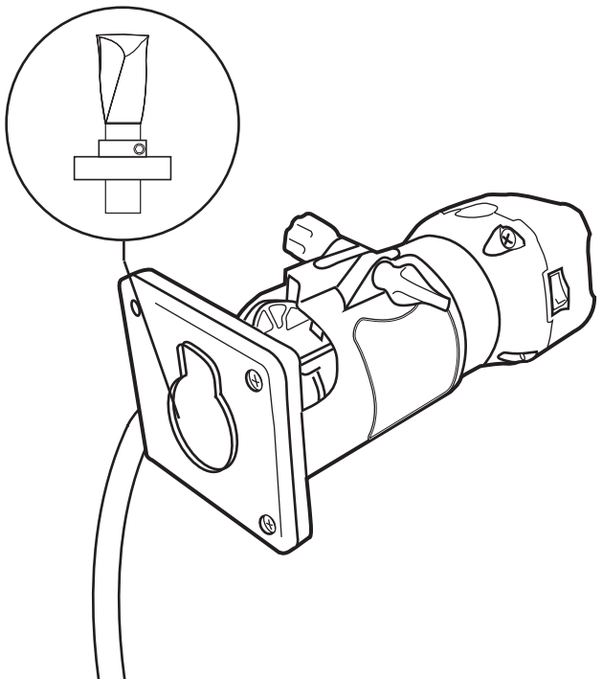

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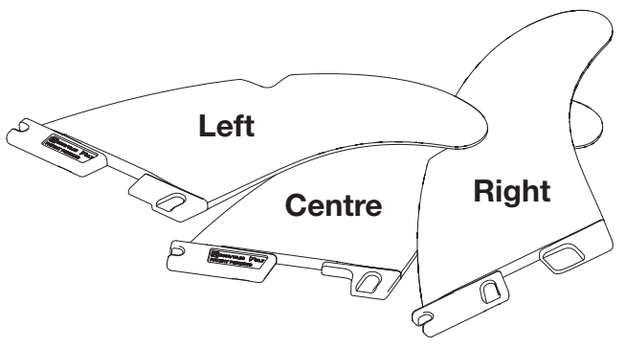

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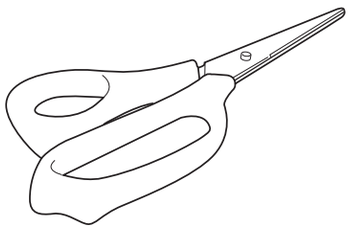

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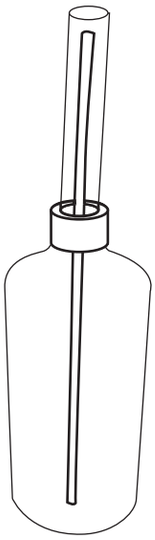

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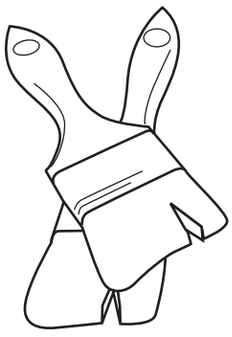

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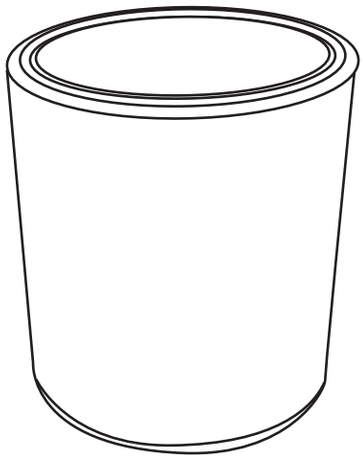

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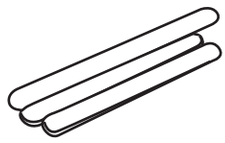

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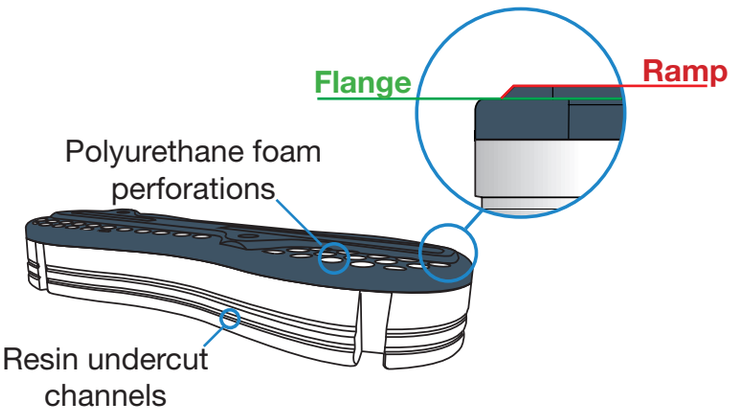
A note on fin plugs

The cant angle for each plug is critical for correct fin placement. Pay attention to the colour printed onto the plug for the best result.



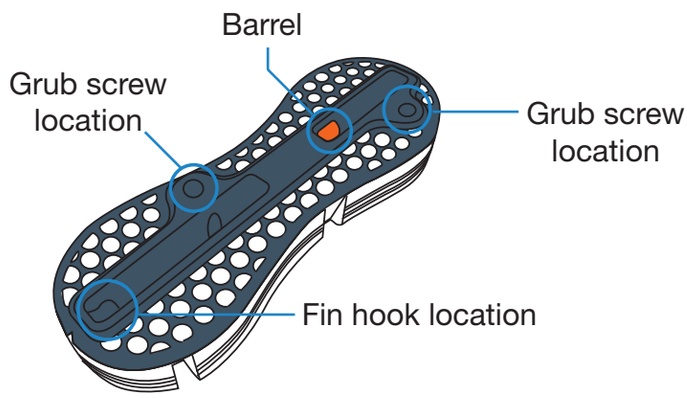
Cant angles

1/ The cant angle is built into the plug. The plugs are colour coded according to their cant angle.

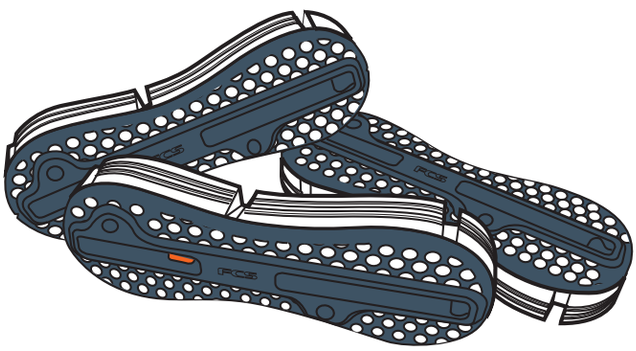
2/ Centre plugs are unprinted.

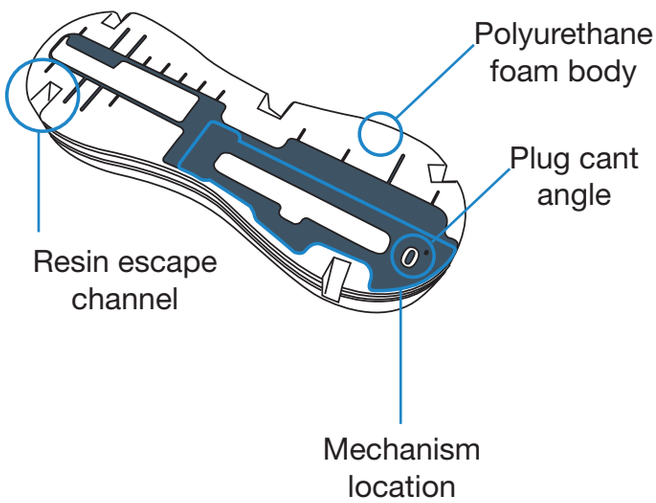
3/ For centre plugs, ensure the C is present on the plug.

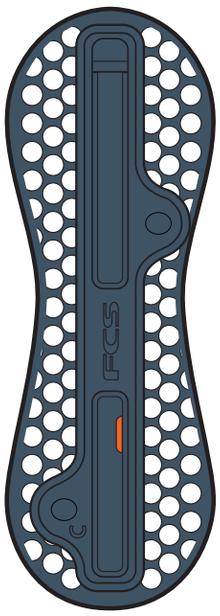
4/ The orientation letters, arrows and print are sanded off after the installation.



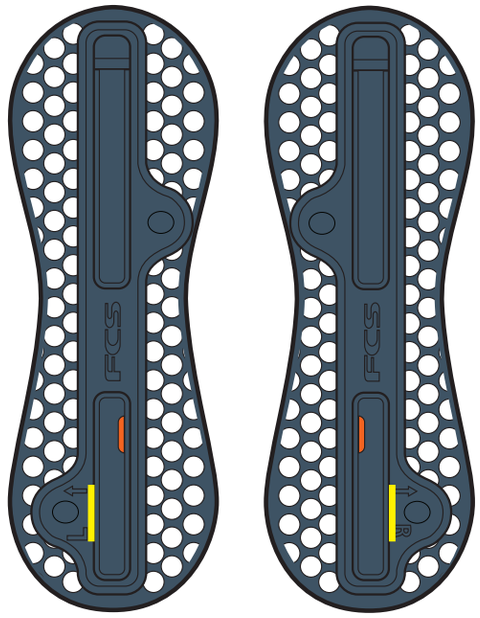
WARNING: ***DO NOT wipe FCS II plugs with acetone, before or after the installation, as it will permanently damage the plug.***







0 Degrees
No Print



3 Degrees
Yellow

5 Degrees
Grey

9 Degrees
Orange

A note on fin plugs

For correct fin placement of thrusters, follow these points.

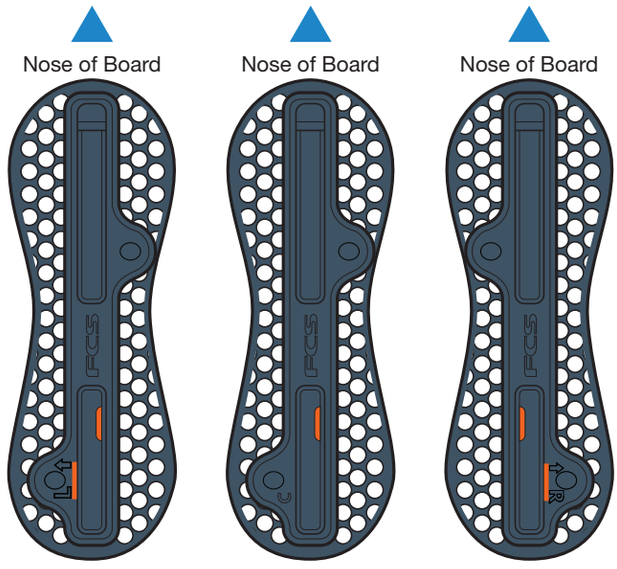
1/ The cant angle is built into the plug. It is recommended that you use the FCS II dummy fins when setting the cant angles.

2/ For rail plugs, ensure the arrows are pointing toward the rail.

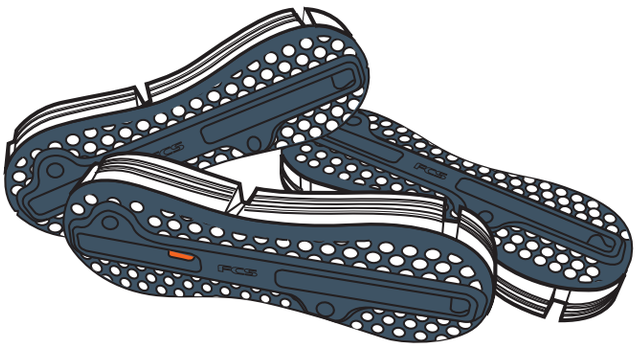
3/ For centre plugs, ensure the C is present on the plug.

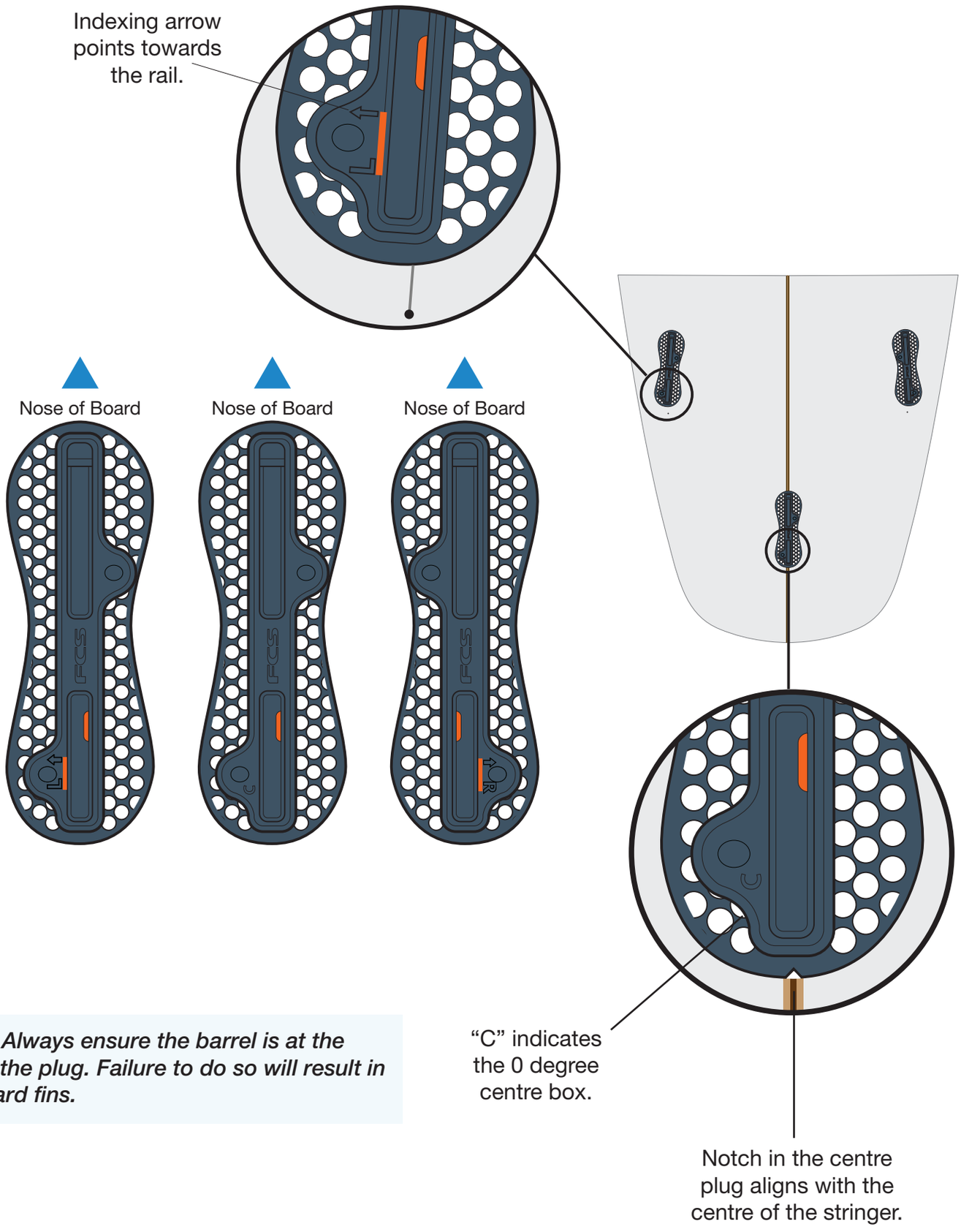
4/ The orientation letters, arrows and print are sanded off after the installation.

Thrusters



Left 9 Degree Rail	Centre 0 Degree	Right 9 Degree Rail





Note: *Always ensure the barrel is at the rear of the plug. Failure to do so will result in backward fins.*

A note on fin plugs

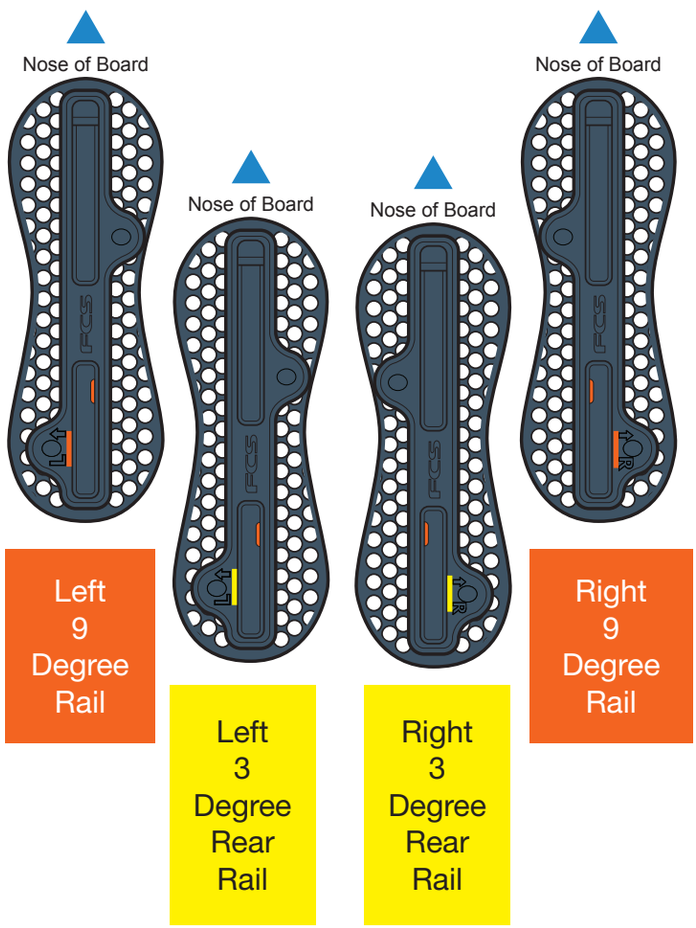
It is critical that the correct quad rear plugs are used. Pay attention to the following steps to avoid incorrect orientation.

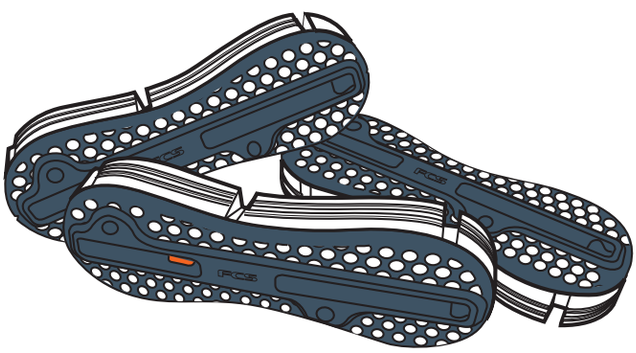
1/ The cant angle is built into the plug. It is recommended you use the FCS II dummy fins when setting the cant angles.

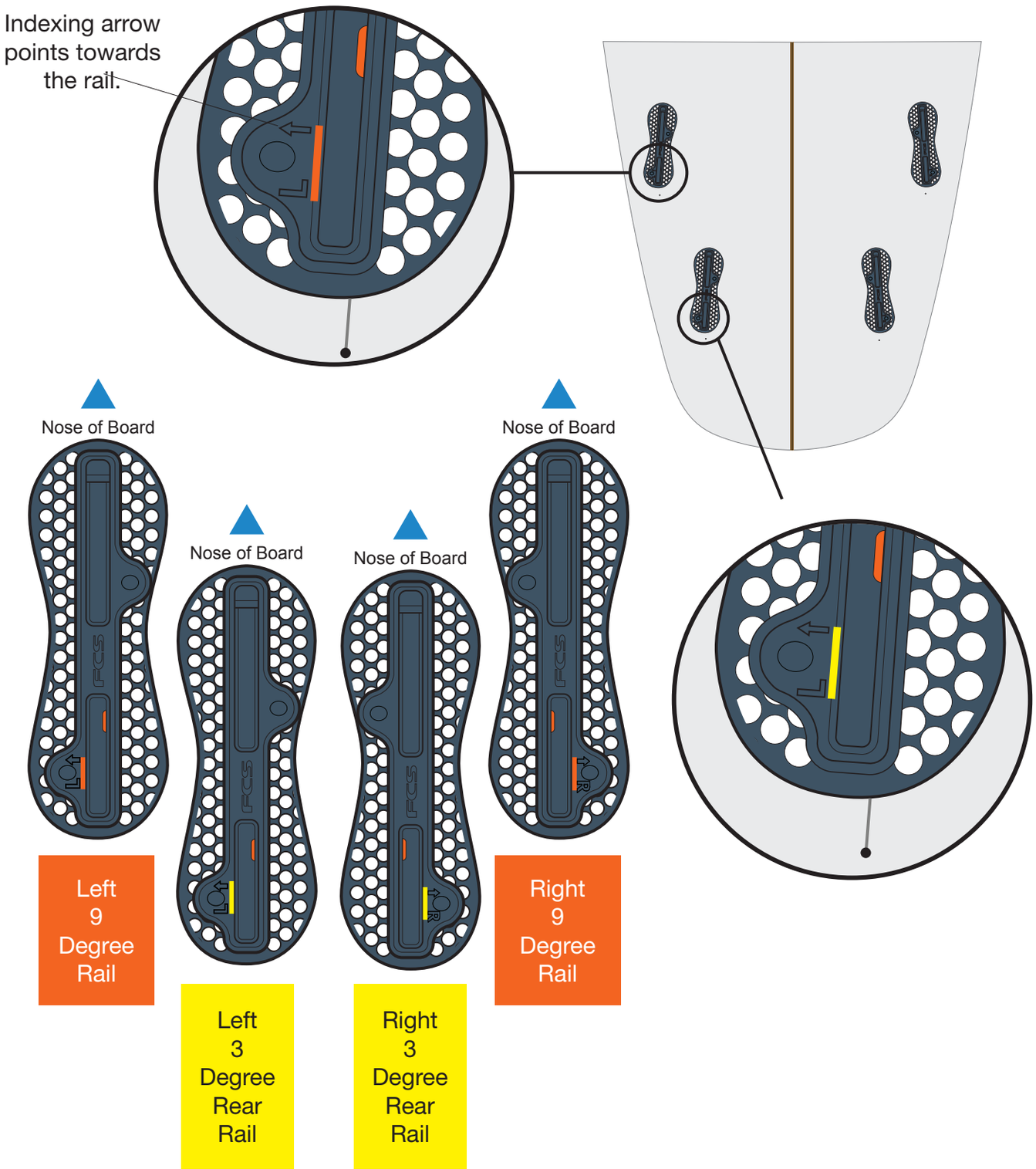
2/ For Quads the rear plugs MUST be either the 3 or 5 degree plug. Centre plugs cannot be used for quad rear fins.

3/ The orientation letters, arrows and print are sanded off after the installation.

Quads



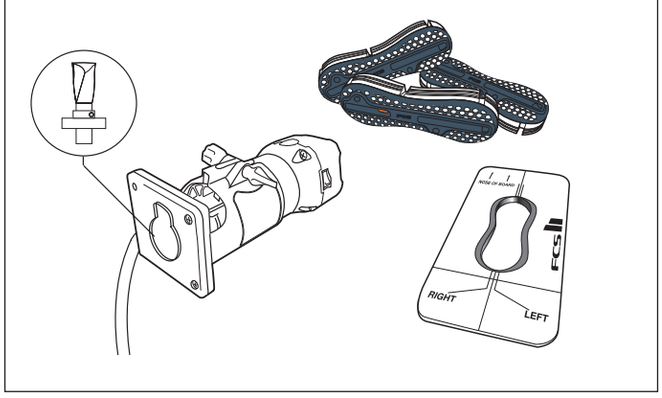



Indexing arrow points towards the rail.
Nose of Board
Nose of Board
Nose of Board
Nose of Board
Left 9 Degree Rail
Left 3 Degree Rear Rail
Right 3 Degree Rear Rail
Right 9 Degree Rail

Before you make the cut

To ensure the installation of the FCS II plugs is performed efficiently and safely there are a number of steps that must be undertaken prior to cutting the plug cavities.

You will need:



Router Depth

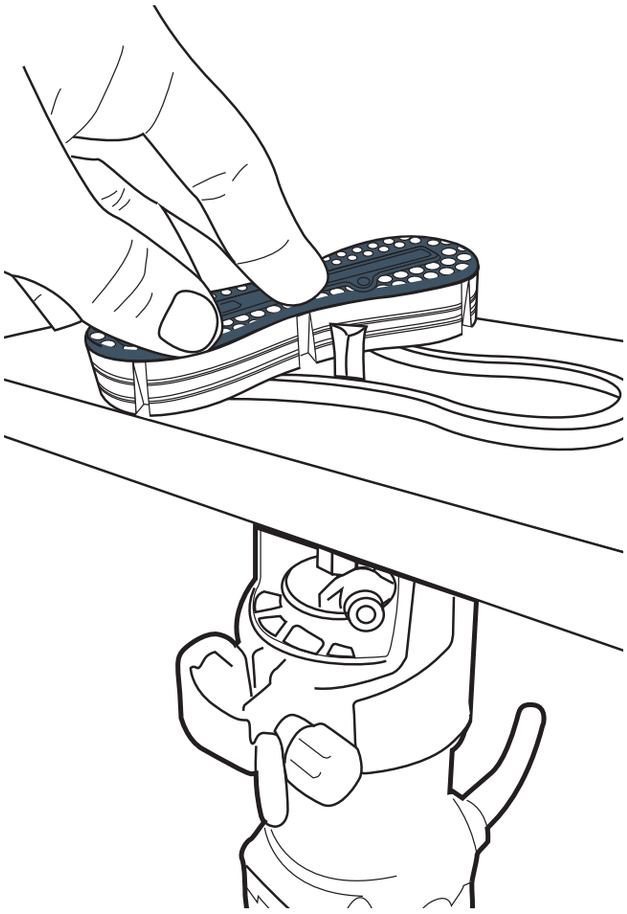
WARNING: *Turn off the power to the router before setting the depth.*

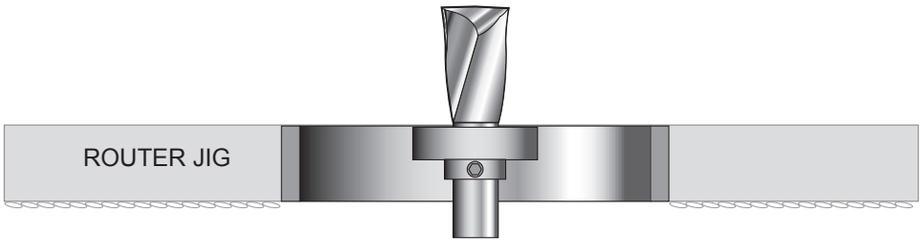
1/ Invert the router and place the FCS II router jig over the cutter.

2/ Place an FCS II plug onto the router jig.

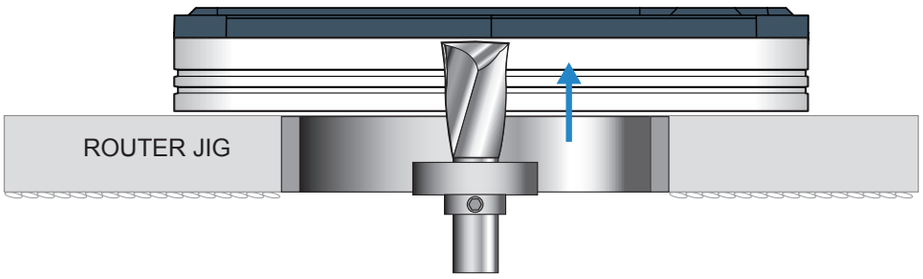
3/ Adjust the depth of the cutter to align 0.5mm - 1mm above the flange on the top of the FCS II plug.

TIP: *To confirm if the depth is set correctly, always cut a scrap piece of foam and insert an FCS II plug. It is recommended that the plug sits 0.5mm below the foam to ensure maximum strength after glassing.*

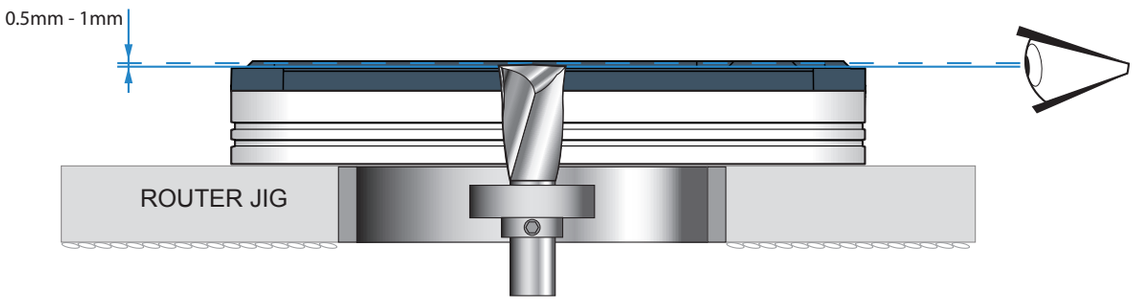




Placing the router jig on the router.

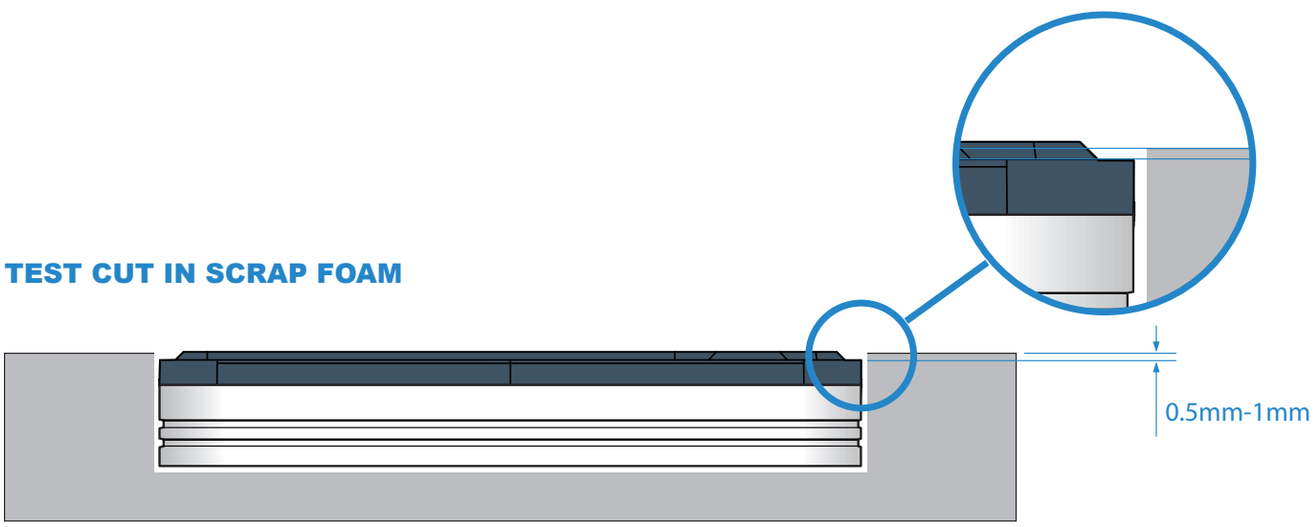


Aligning the cutter to sit above the flange of the plug.



Adjusting the depth of the cutter to between 0.5mm - 1mm above the flange.

TEST CUT IN SCRAP FOAM



Before you make the cut

Cutting the cavities relies on precise marking out. Follow these steps to ensure an accurate result.

Marking out

1/ If not already marked by the shaper, mark the shaper's dots as usual to determine fin placement.

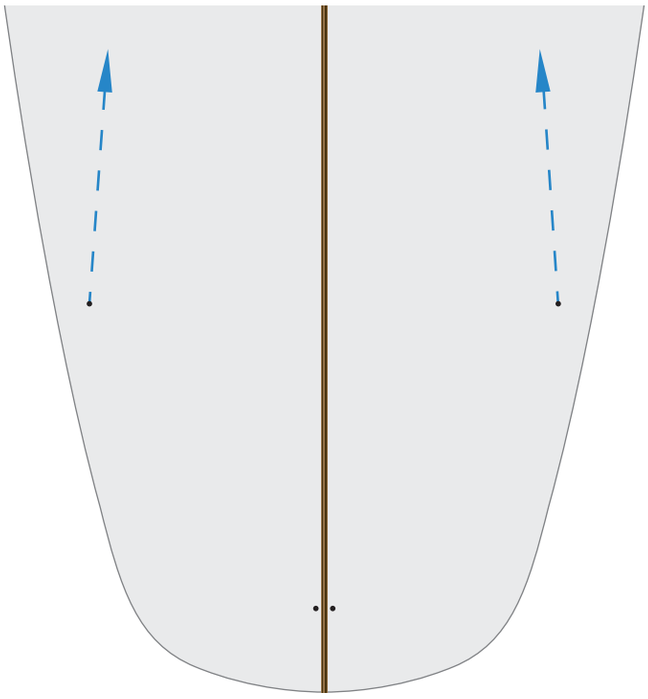
2/ Draw a line that extends 5" towards the nose of the board.

3/ Place a shaper's weight on the foam blank to ensure stability during the install process.

4/ Align the rear shaper's dot with the cross hairs on the jig and the line drawn. See next page for more detail.

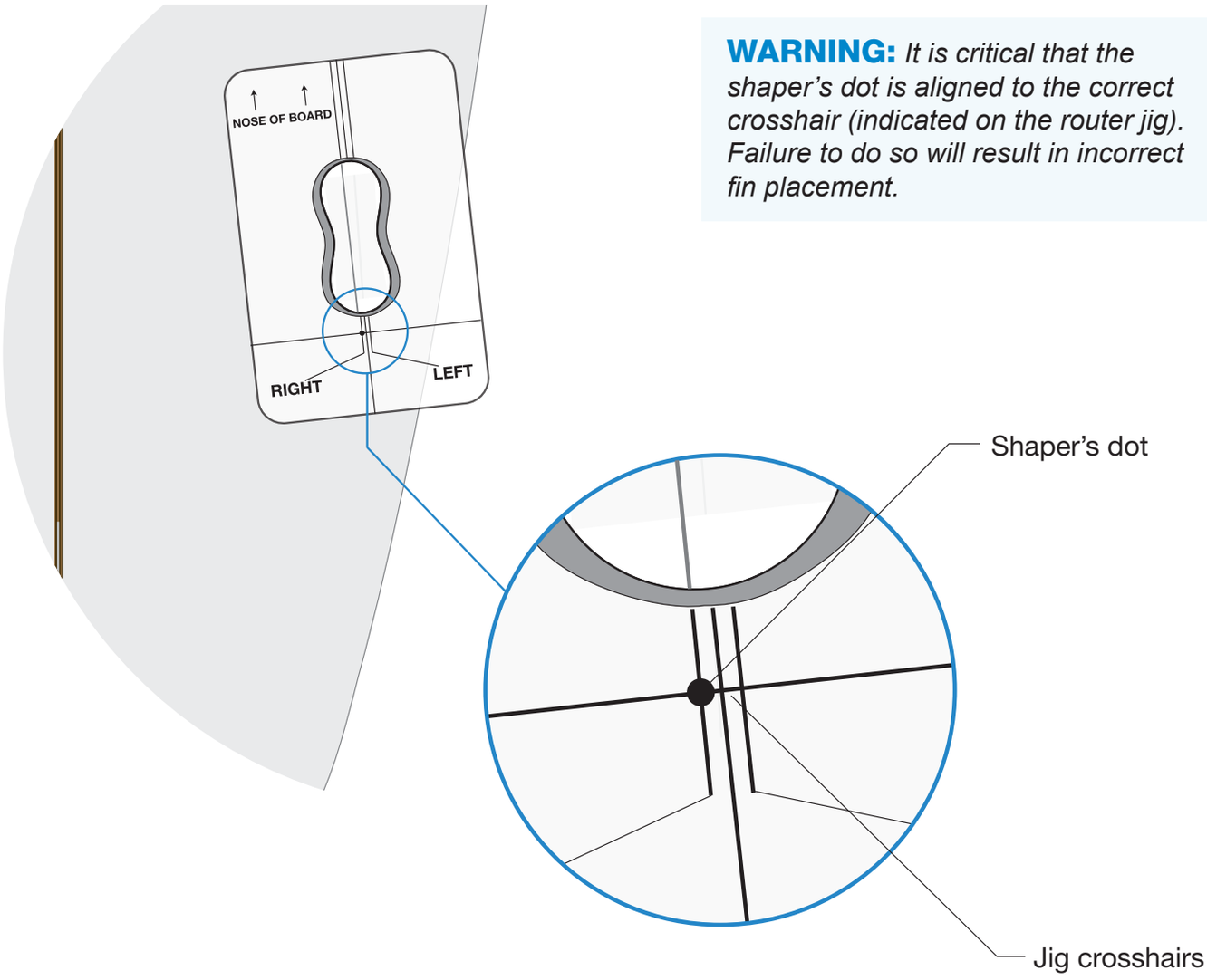
TIP: *For extra security, the jig can be taped in place until the plug cavity is cut.*

NOTE: *To avoid a line showing on the board after cutting the cavity, a second dot can be placed 5 inches from the shapers dot to align the jig to.*



Drawing a 5" (125mm) line towards the nose.

WARNING: *It is critical that the shaper's dot is aligned to the correct crosshair (indicated on the router jig). Failure to do so will result in incorrect fin placement.*



Jig crosshairs aligned to shaper's dot.

Making the cut

With the jig in place it is now time to make the cavities for the FCS II plugs. To ensure this is an efficient and safe procedure please take note of the following.

Plunging the cutter

When initially cutting into the foam, it is important that the router shoe is in contact with the jig before the cutter makes contact with the foam.

1/ Turn on router away from the board and jig.

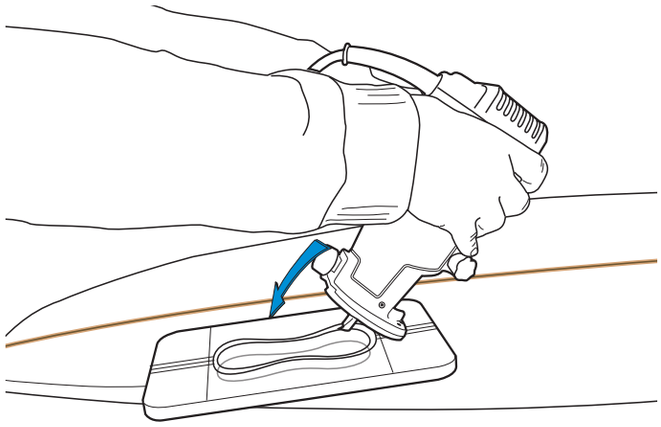
2/ Place the straight edge of the router shoe onto the jig with the moving cutter angled toward the foam.

3/ With 2 hands, slowly lower the cutter into the foam.

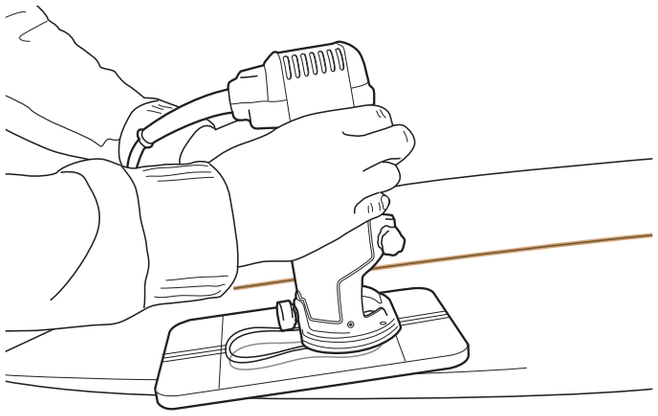
4/ Once the router is flat on the jig, use one hand to control the router and the other to secure the jig in place.

TIP: *If the jig is sticky, rub some parafin wax to help the router glide more easily.*

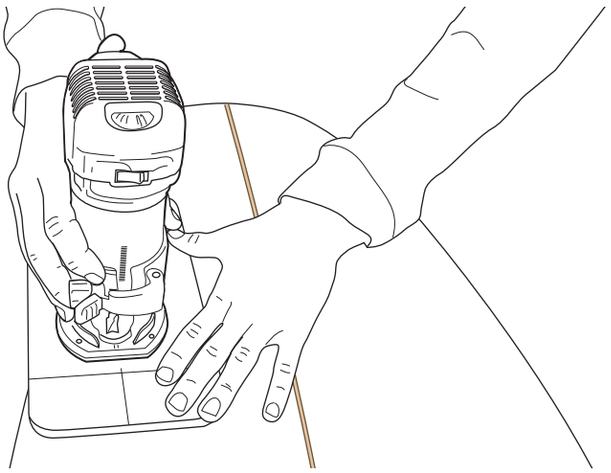
TIP: *When doing a stringer cut, ensure the cutter is plunged next to the stringer, not on top of it.*



Using 2 hands, lower the router into the foam.



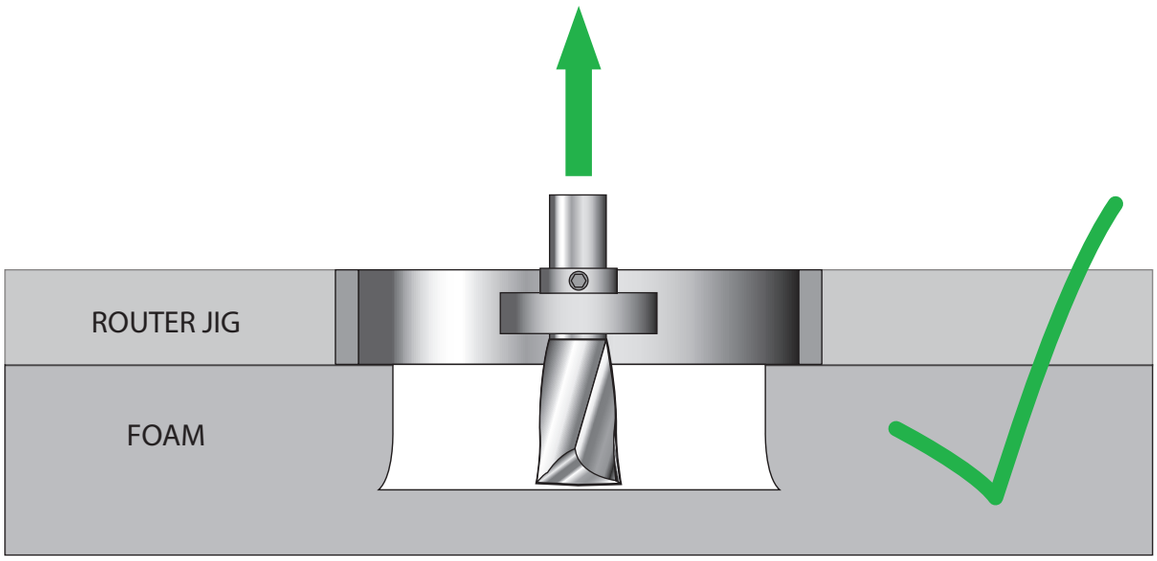
Place router flat on the router jig.



Secure jig using spare hand.

IMPORTANT

The cutter used to route the cavity is flanged. The cutter **MUST** be removed from the centre of the cavity **NOT THE PERIMETER**. Removing the cutter from the perimeter will damage the jig, board and installer.



CAUTION: *When routing wear hearing, eye and dust protection to avoid injury.*

For cuts that DO NOT interact with stringers

When routing the cavities to set the plugs, accuracy is essential. Use the following method to help achieve the best result.

1/ Turn the router on and plunge the cutter into the centre of the foam area (refer to previous instructions).

2/ In smooth, even strokes, remove the foam from the centre of the cavity.

3/ With the majority of the centre foam removed, cut around the perimeter making sure the bearing is in contact with the jig.

4/ Once the perimeter is cut, remove any excess foam in the centre.

5/ With all foam removed, keep the cutter in the centre and turn off the router.

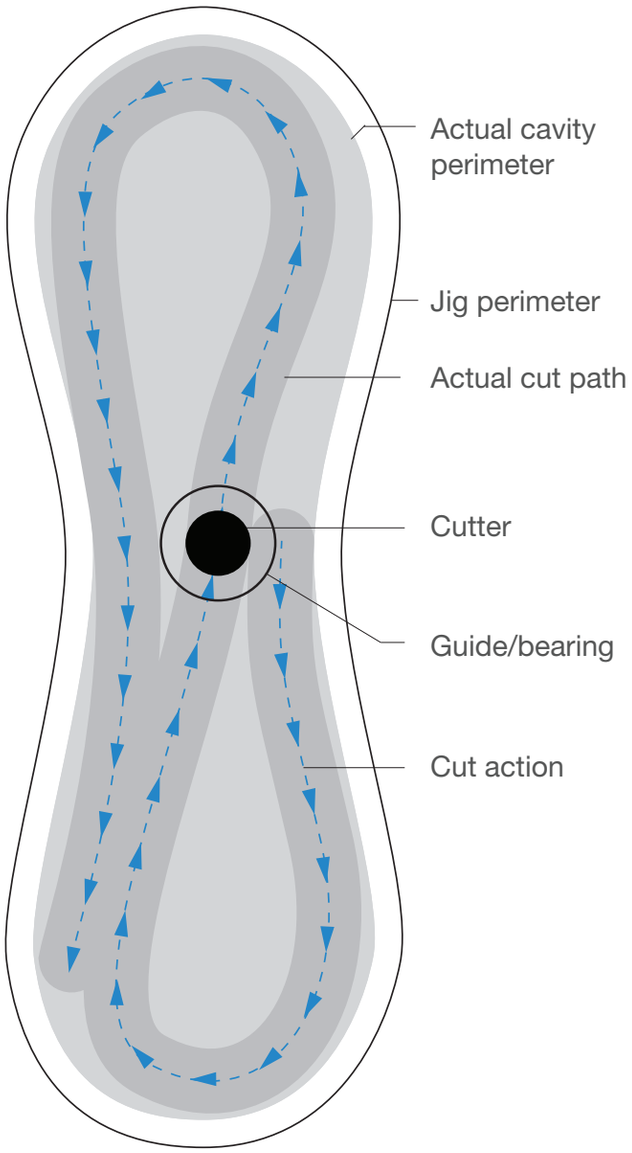
6/ When the cutter is stationary, remove the router from the cavity.

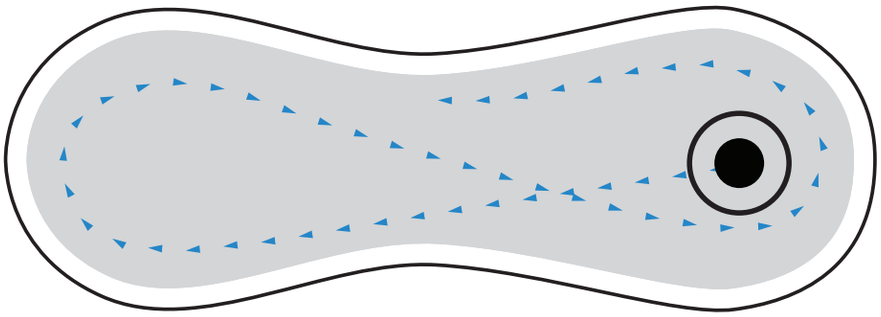
7/ Insert an FCS II dummy fin into a plug and insert the plug into the cavity to check the depth before removing the jig from its position.

8/ If the depth is correct, remove the jig. If not; reset the cutter depth and repeat steps 1 - 7.

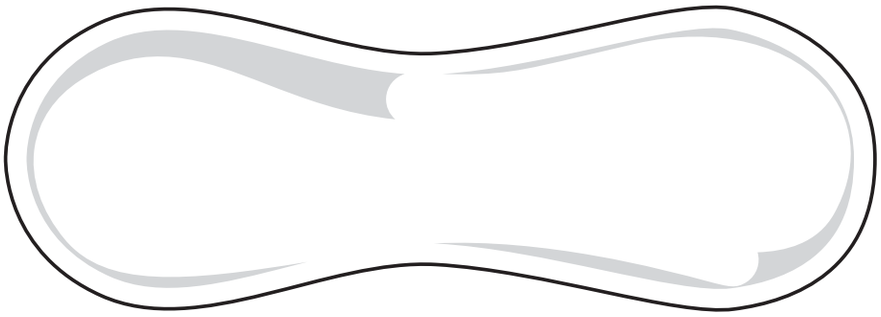
TIP: To ensure accuracy, remove foam dust with compressed air before cutting the perimeter.

WARNING: *Removing the cutter from the cavity while still moving increases the risk of the cutter hitting the jig. This can result in damage to the board, the jig and the operator. Ensure the router is off before moving to the next cut.*

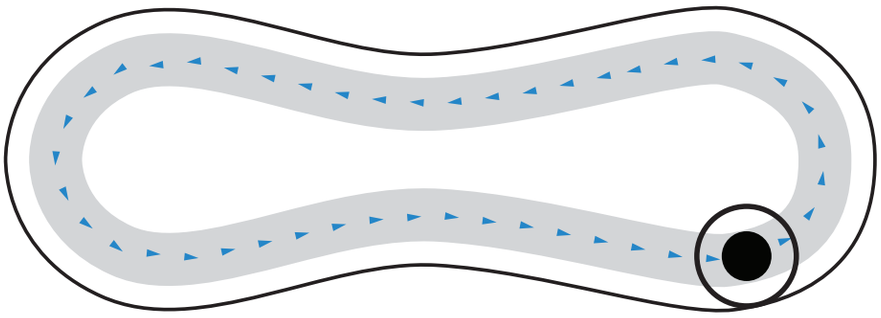




Router plunged into the cavity.



Foam removed from the centre of the cavity.



Foam removed from the perimeter of the cavity.

For cuts that DO interact with stringers

Cutting through the stringer has the risk of stringer blowout which can effect the success of plug installation. To reduce the risk of blowouts, use the following method.

1/ Turn on router and carefully lower into foam to the right of the stringer.

2/ Move the cutter to the top of the stringer (toward the nose of the board) and slowly cut through it from right to left.

3/ Once cut through, move the cutter back through the stringer cut and down the right hand side, cutting only the foam.

4/ Slowly cut through the bottom of the stringer from right to left.

5/ With the cutter now on the left of the stringer, make several passes down the stringer, planing it until only a thin vertical wall remains.

6/ Cut the complete perimeter of the cavity. Once the perimeter is cut, turn off the router, wait for it to completely stop and remove it from the cavity.

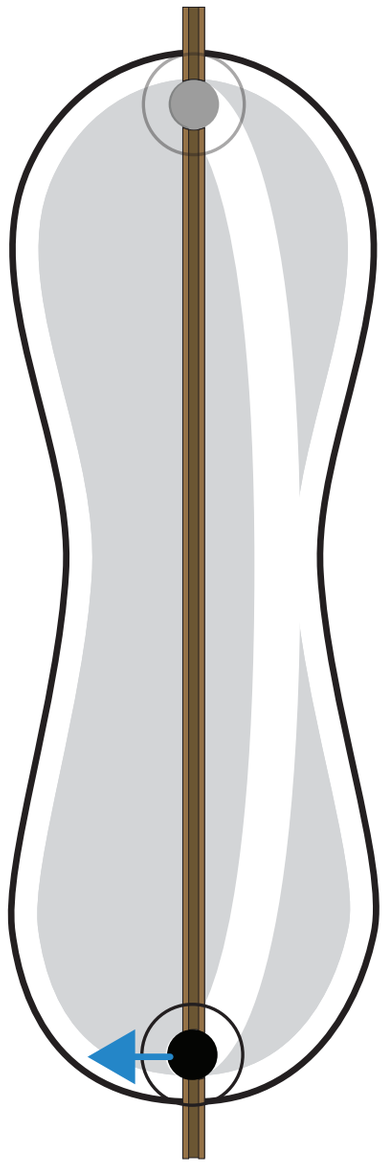
7/ Using your finger, break out the remaining thin piece of stringer.

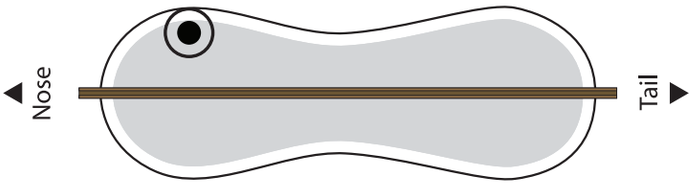
8/ Place the router back into the cavity, turn on and remove the final piece of foam.

9/ Insert an FCS II dummy fin into a plug and insert the plug into the cavity to check the depth before removing the jig from its position.

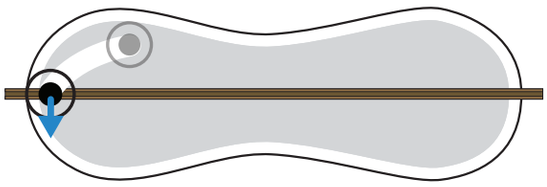
8/ If the depth is correct remove the jig. If not, reset the cutter depth and repeat steps 1-8.

9/ The cavity is now prepared to insert an FCS II plug.

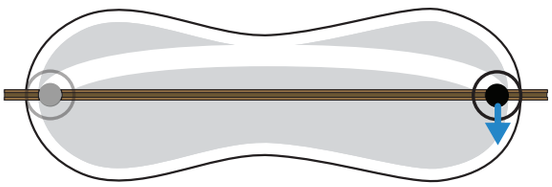




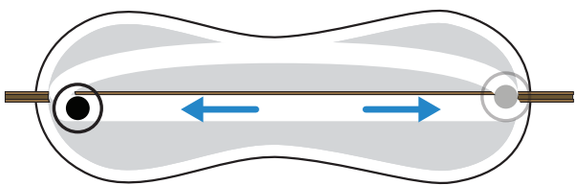
Lower the cutter into the foam on the right side of the stringer.



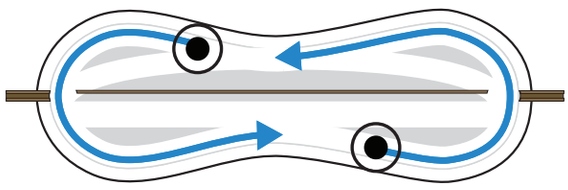
Move the cutter to the top and cut through the stringer completely.



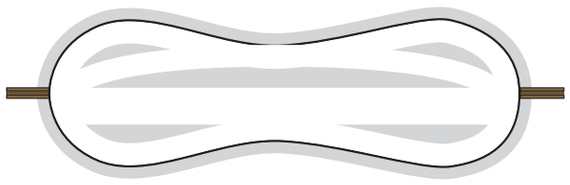
Move the cutter to the tail of the board cutting only the foam.



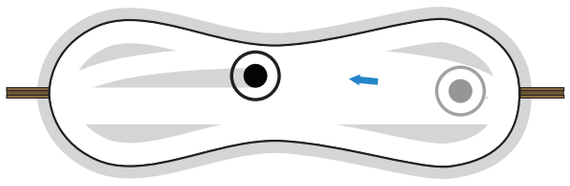
Plane down the stringer.



Cut the perimeter foam.

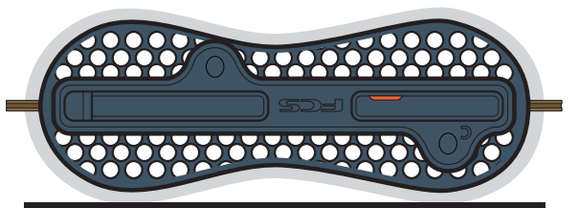


Remove the cutter then break out the remaining stringer.



Return the router and remove the remaining foam.

The cavity is prepared for the plug.

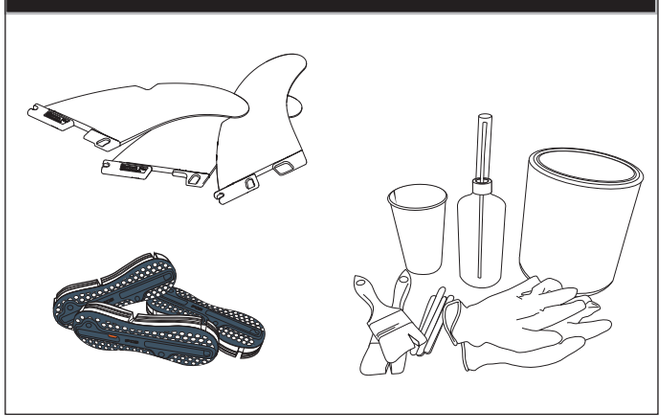


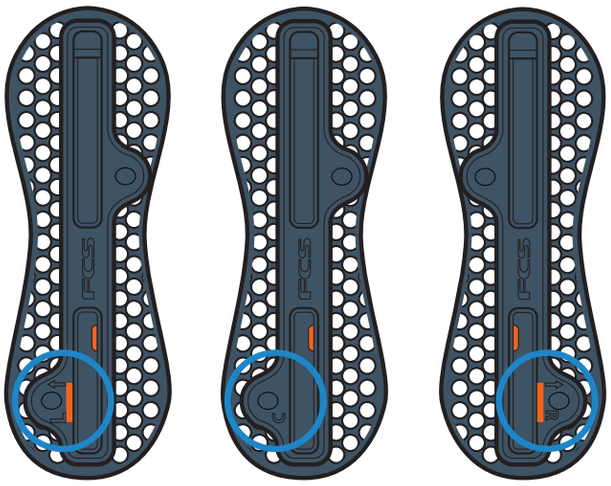
Plug inserted into the cavity to check the cut depth.

Setting the plugs

When setting the plugs it is critical to align them correctly before installation. Use the following method to avoid confusion.

You will need:



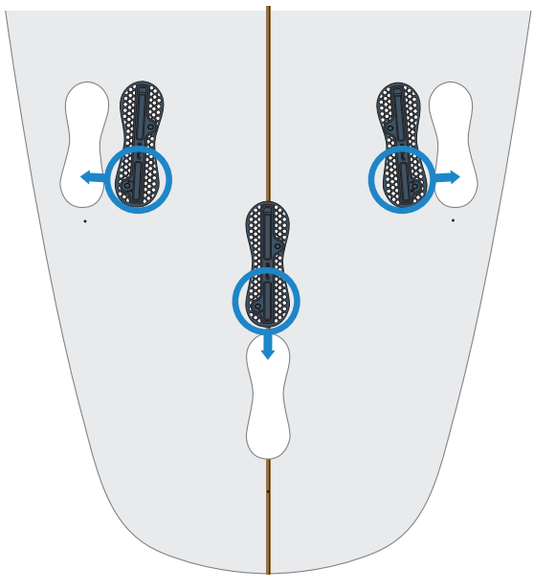


Plug Preparation

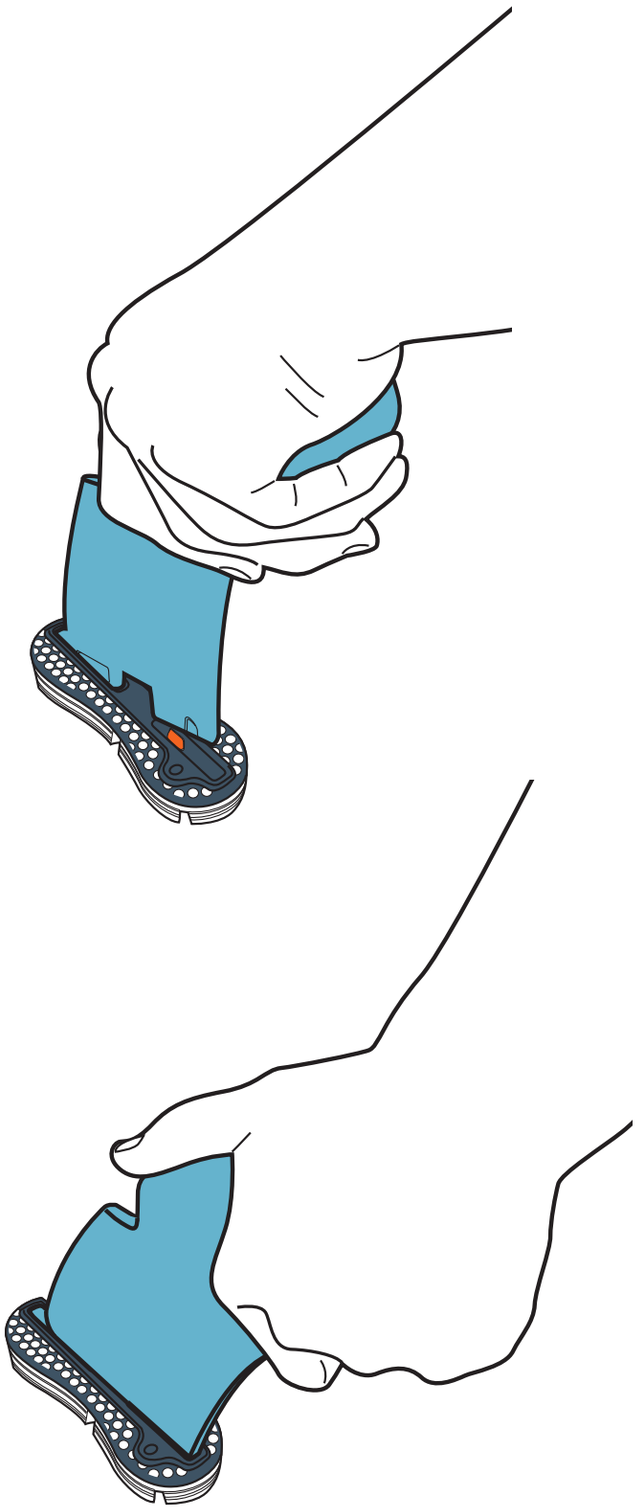
1/ Place the FCS II plugs on the board in the correct orientation to avoid confusion during install.

2/ Secure the FCS II dummy fins to the FCS II plugs before install. The fins are designed to fit snugly into the plug to ensure they are secured during the install process.

WARNING: ***DO NOT install the system without using the dummy fins as it may result in incorrect fin angles and orientation.***



FCS II plugs placed on the board in the correct orientation.



Securing dummy fins to plugs.

Setting the plugs

Applying the correct amount and type of resin to the plugs will ensure a strong bond between the plug and foam without increasing the weight of the board. Use the following method to achieve the best result.

Resin

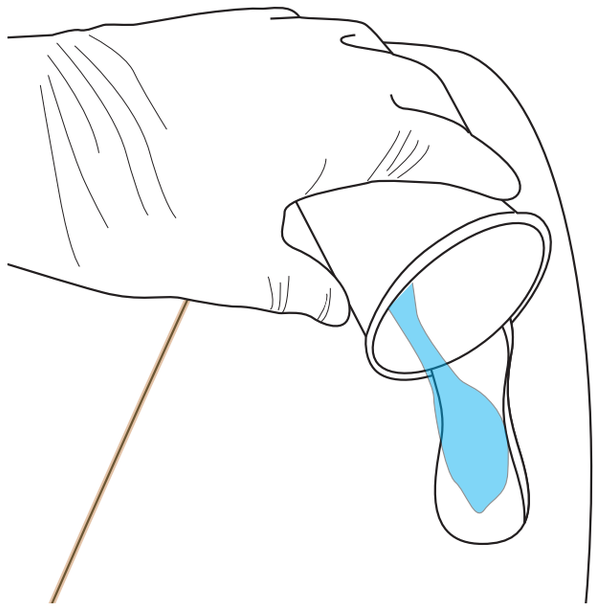
1/ Mix about 8mls of resin (per cavity) in a container and catalyse.

2/ Pour approximately 8mls into the plug cavity. With a brush, wet out the walls of the cavity.

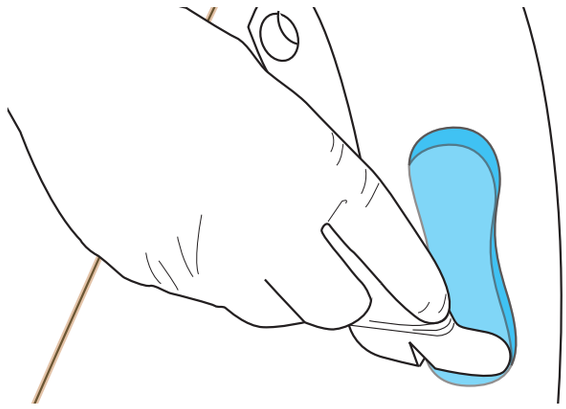
3/ Holding the plug by the dummy fin, use a brush to apply a thin layer of resin onto the sidewalls and base of the FCS II plug.

TIP: *For epoxy resin systems remember to mix a slurry of resin and FCS glass powder. This will reduce the chance of out-gassing.*

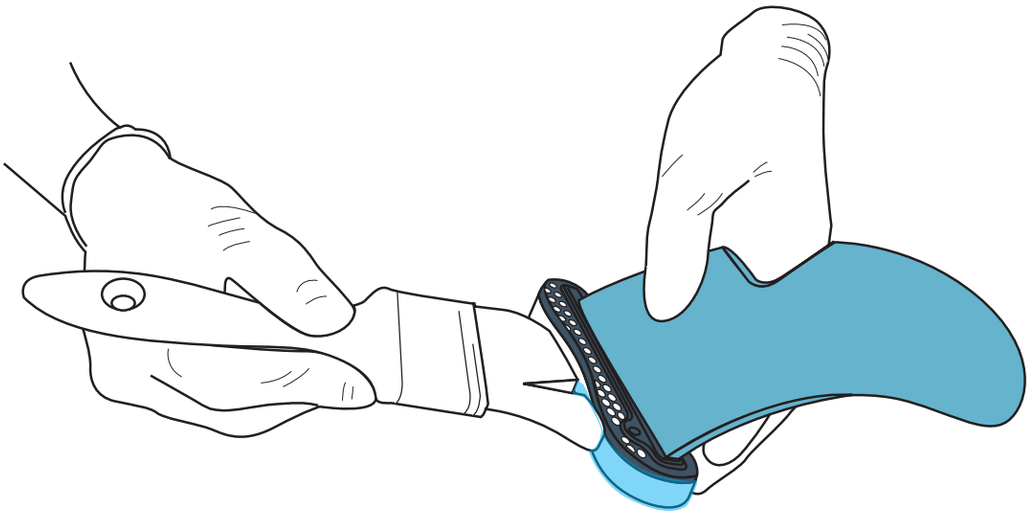
TIP: *The addition of Cabosil will thicken the resin and allow for more control over the flow of any excess spillage during the installation and significantly increase the strength of the system.*



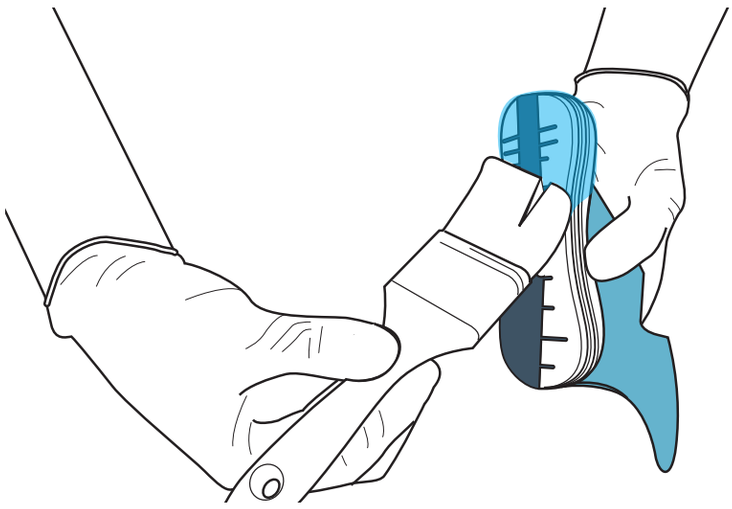
Pouring resin into cavity.



Brushing resin around the cavity sidewalls.



Brushing resin onto sides of plug.



Brushing resin onto base of plug.

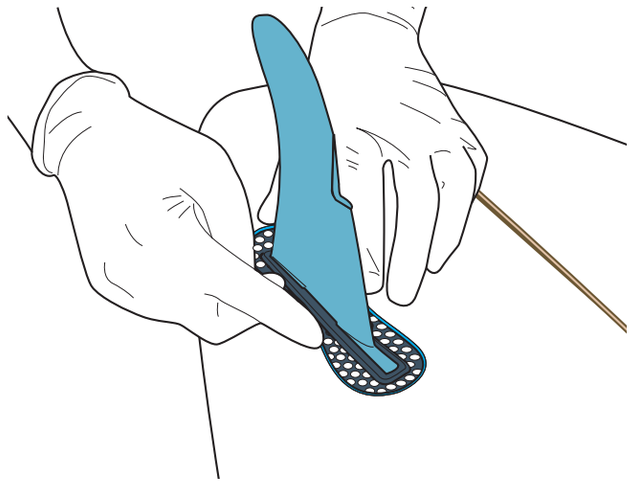
Setting the plugs

As the cant angle is built into the plug, the FCS II dummy fins are recommended for use to give the best impression of final fin placement.

Placement

1/ With the cavity and FCS II plug now wet out, place the plug into the cavity. This should be a snug fit.

2/ Continue to push the plug into the cavity until resin flows over the top of the plug. Take care not to use excessive pressure and damage the blank. Support the board with your other hand on the deck.



Placing the plug in the cavity.

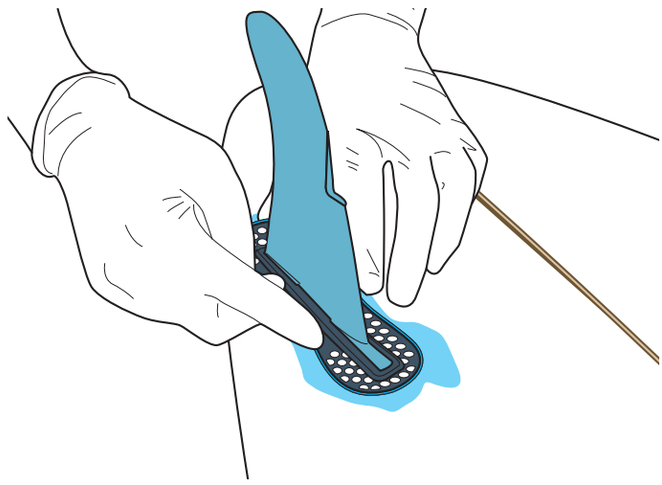
TIP: *Place a thick piece of soft foam between the blank and shaper's stand to avoid dents when pushing the plugs into the cavity.*

3/ Remove any excess resin with a brush or squegee.

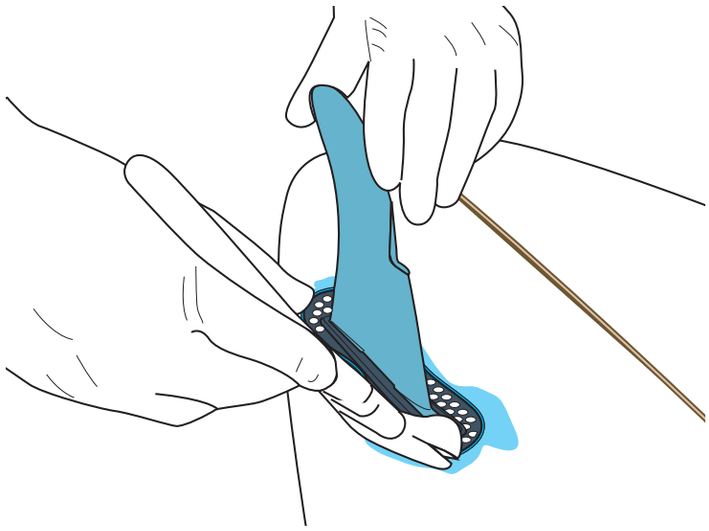
4/ Check the cant, toe angles and depth of the plug is correct, adjust accordingly and then tape down before the resin has gelled.

WARNING: *Ensure resin does not flow into the fin tab cavities. This will bond the dummy fins to the plug or cease the mechanism, resulting in a malfunctioning plug.*

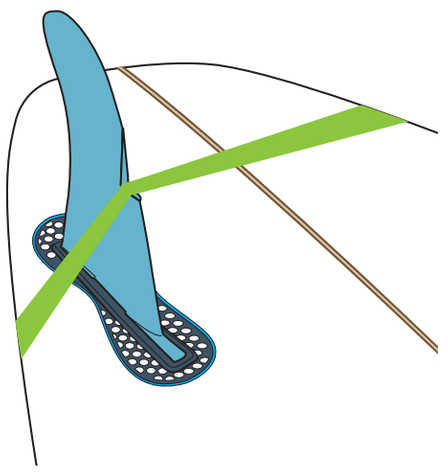
TIP: *We recommend allowing* **12** *hours to cure the resin before removing the tape and dummy fins.*



Continue pushing the plug until resin flows over the top of the plug.



Brush off excess resin (1/2 or 3/4” brush is recommended).



Check cant angles and tape in place for 12 hours until resin is fully cured.

Glassing the plugs

To ensure the strongest possible bond is achieved with the board, use the following methods when glassing.

Glassing

1/ Once the resin has cured, carefully remove the dummy fins and place a green sticker over the fin tab cavities to seal them when glassing the board.

TIP: *Ensure you rub down the green area of the sticker to create a good seal for glassing.*

2/ Cut out football shaped patches to be placed over the plug. The patches should extend 1" (25mm) around the plug. A minimum of 1 x 4 oz patch is recommended to effectively strengthen the fin area.

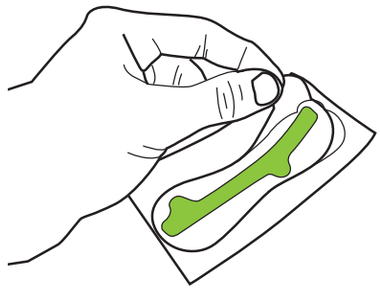
3/ Mix the resin and pour a small amount of resin over each plug to allow the resin to saturate the 2 layers of cloth.

4/ Once the final passes have been made and the rails tucked to the deck, come back to the plugs and use a gloved finger to work out any air bubbles. Add a small drop of resin, if required, to problem areas.

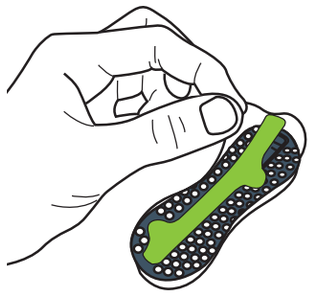
5/ Sometimes it might be necessary to create a small slit in the cloth (using a razor blade) to relieve the tension over the ramp.

6/ After hot coating, sand the board to the desired finish.

TIP: *For manufacturers who baste the fin area to pre-sand the plugs, we recommend using a new sticker before the final hot coat.*



Remove sticker and clear carrier from backing.



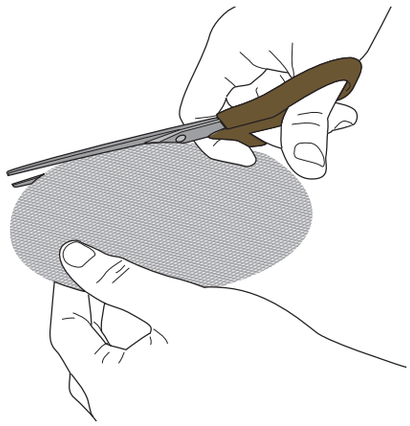
Place sticker and carrier onto the top of the plug.

Rub down sticker to adhere it to the plug.

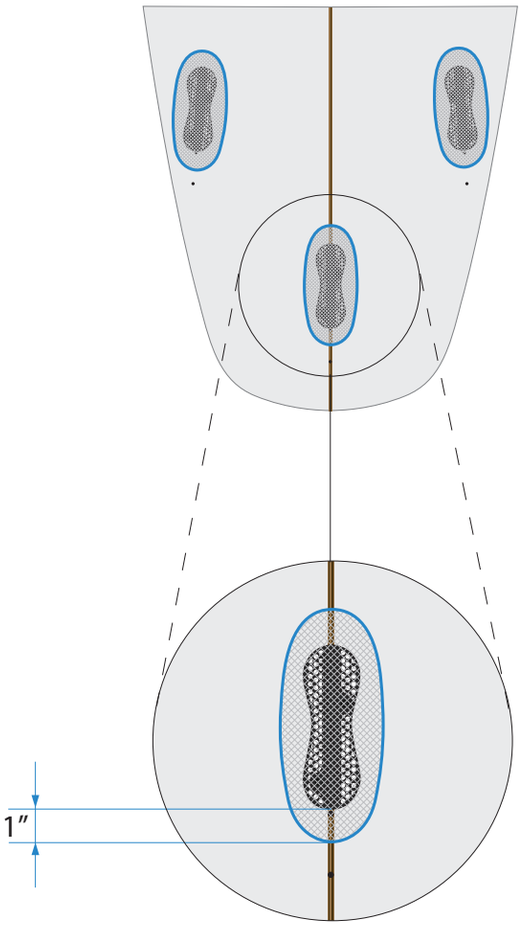
Peel off the carrier, leaving the sticker behind to seal the slots.

WARNING: *When sanding the plug the sanding depth should remove the L, R or C letter without removing the FCS logo. If the logo no longer appears on the fin plug, the installation is too shallow. If the letter still appears on the plug, the installation is too deep. In both cases, the plug won't effectively hold the fin.*

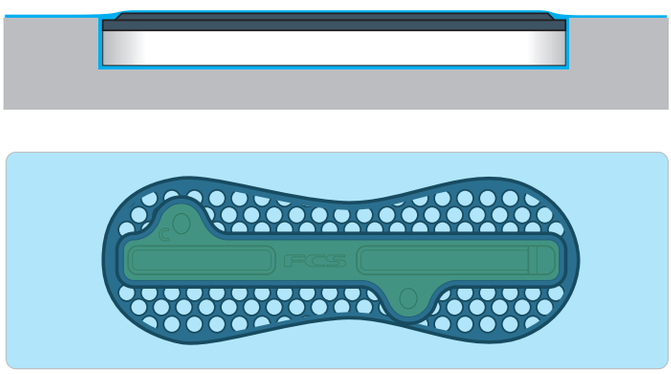
*To avoid this, ensure the installation depth is correct (refer to "**before you make the cut**").*



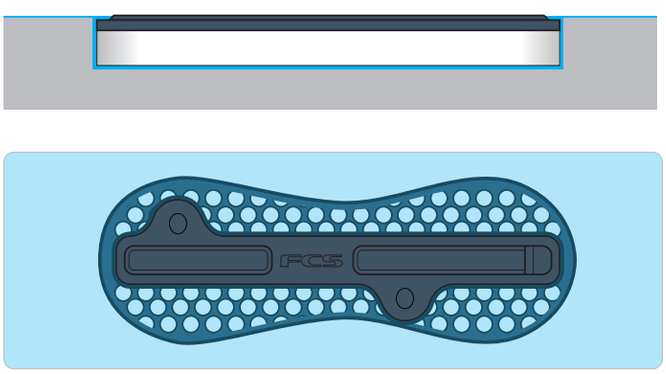
Cutting football patch.



Reinforcing football patches cut to size.



FCS II plug covered before sanding.

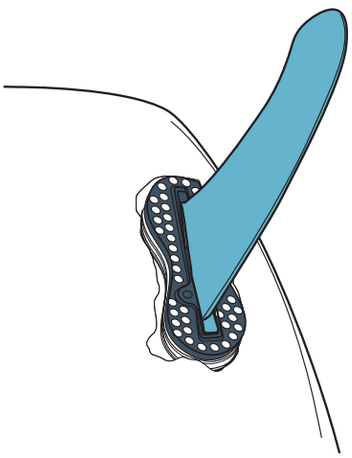


FCS II plug after sanding, letter is removed, logo remains.

Repairing damaged plugs

Should damage occur to the fin plug area of the board, the following methods should be applied depending on the nature of the damage.

If the FCS II plug has been cleanly broken from the surface glass of the board (see below) this method should be applied.



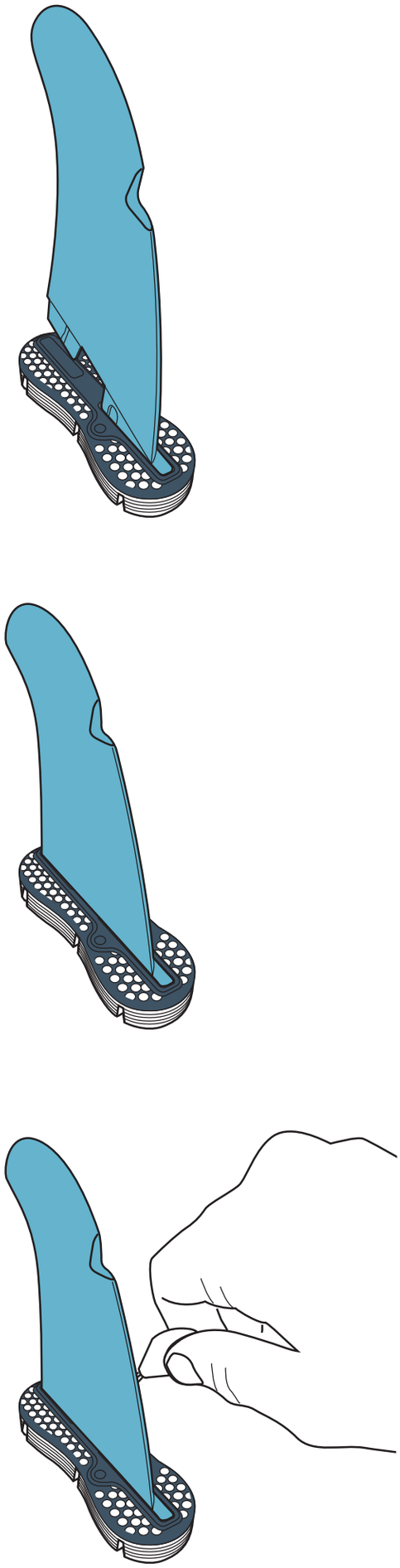
Breakout method

1/ Screw an FCS II dummy fin into the fin plug to give a point of leverage.

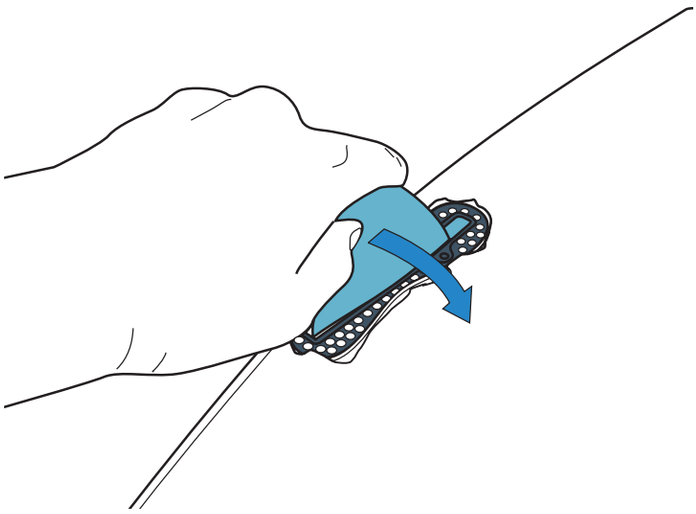
2/ Holding the fin, pull the broken plug free from the cavity.

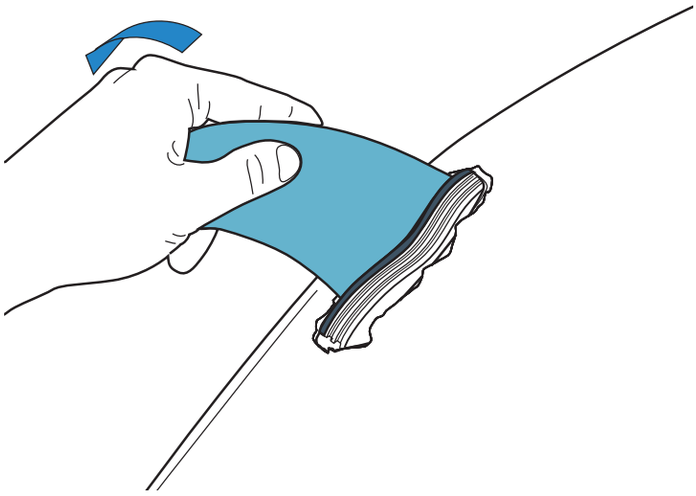
3/ If necessary move the fin from side to side to break the resin and foam bond on the base of the plug.

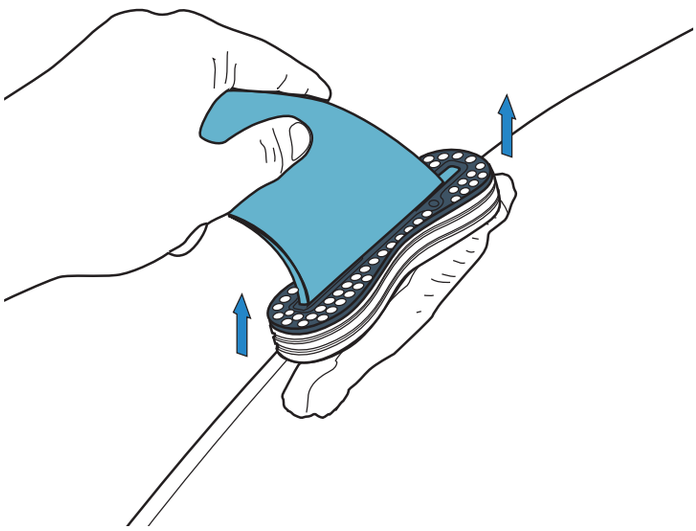
4/ Pull the plug free from the cavity.



Securing dummy fin into damaged plug.



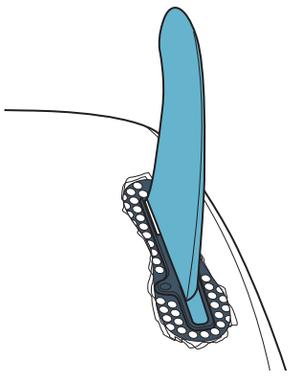




Breaking the damaged plug out of the board.

Repairing damaged plugs

If the glass around the perimeter of the plug is cracked but it's not possible to use the breakout method, the route out method should be used.



Route Out Method

1/ Stack 2 routing jigs and securely tape them together.

2/ Invert the router and place the stacked jigs over the cutter.

3/ Set the cutter depth to between 1.5 - 2mm above the stacked router jigs.

WARNING: ***If the cut depth is set to below 2mm there is risk of the cutter contacting the titanium pin. Do not exceed the recommended 2mm depth.***

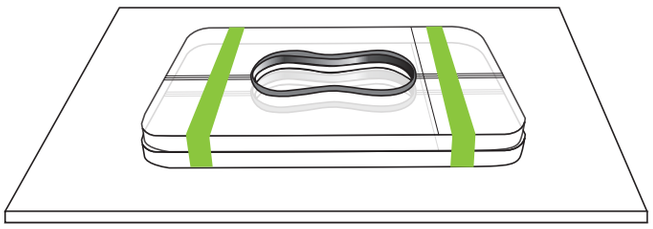
4/ Place the jigs over the damaged plug and tape securely to the board.

5/ Start the router and lower it onto the surface of the broken plug.

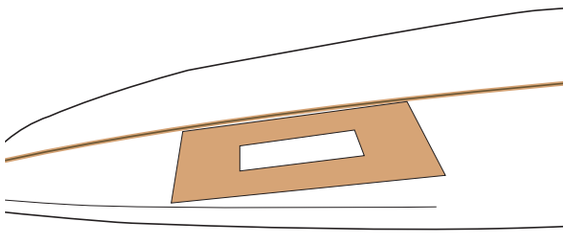
6/ Route out the entire top of the plug to release the bond between the plug and glass.

7/ Turn off the router, when stopped remove from the cavity.

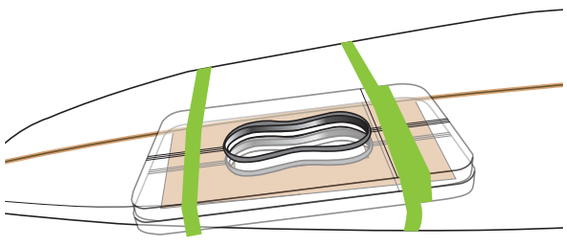
TIP: Use spray adhesive to attach a frame of sandpaper around the plug, to the board. This will stop the jig from slipping.



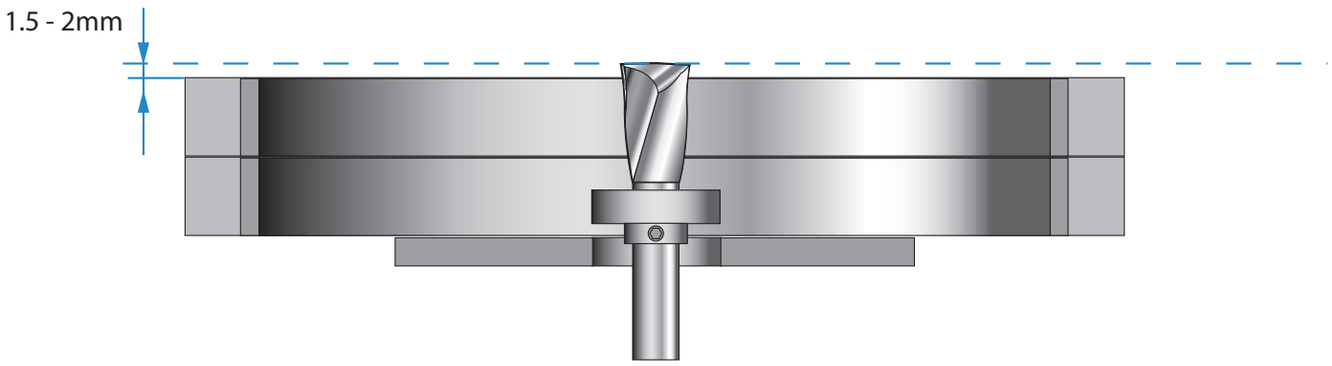
Stacking and taping 2 jigs together.



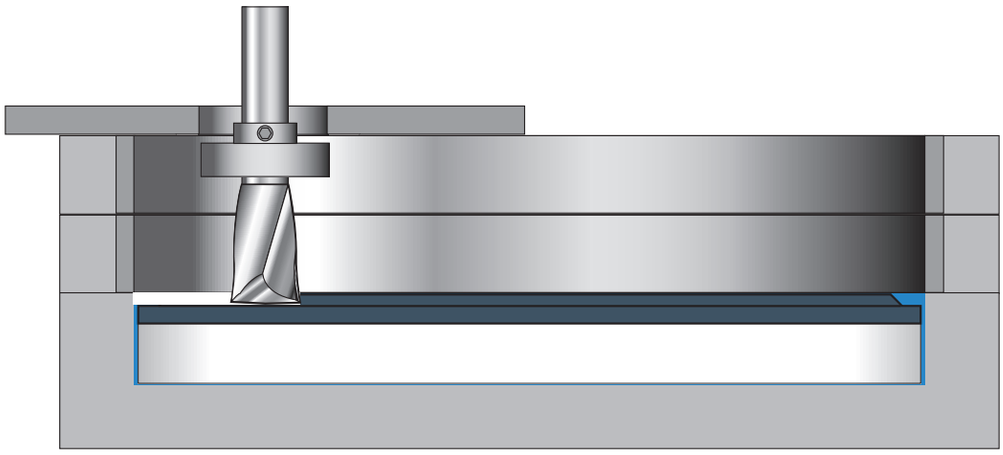
Sandpaper frame attached to board to stop jig slipping.

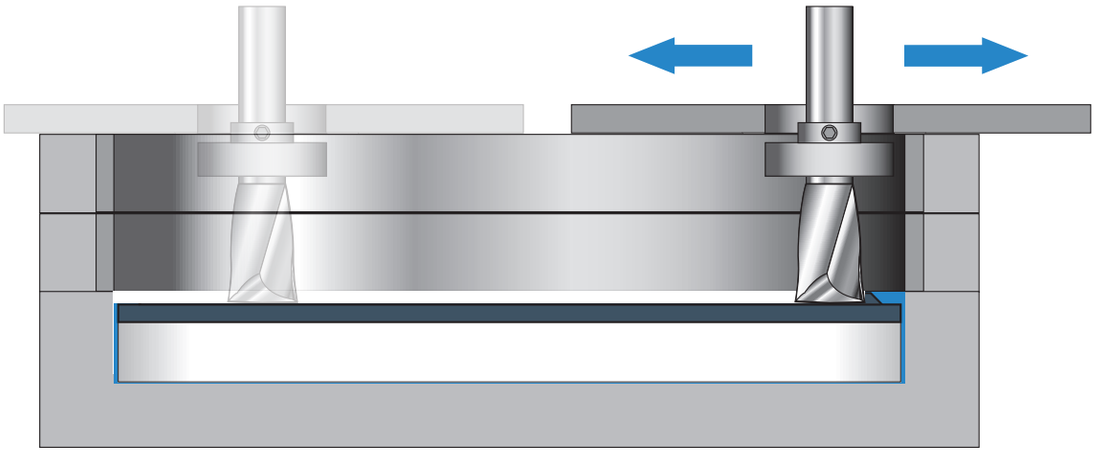


Taping the stacked jigs to the board.



Setting the depth of cut to 1.5 - 2mm.

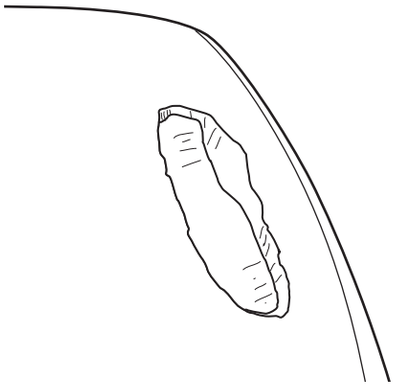




Using the stacked jigs to remove the top off the damaged plug.

Repairing damaged plugs

If a large impact to the fin causes the entire plug to release from the board leaving a rough cavity, the following method should be applied.



Plug Blowout

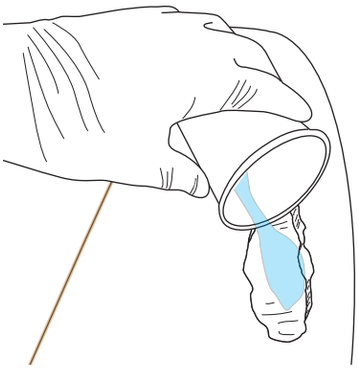
1/ Mix a light blend of Q-cell and resin to backfill the cavity created by the plug.

2/ Pour in Q-cell and allow it to harden. When fully cured, sand back to match the base of the board.

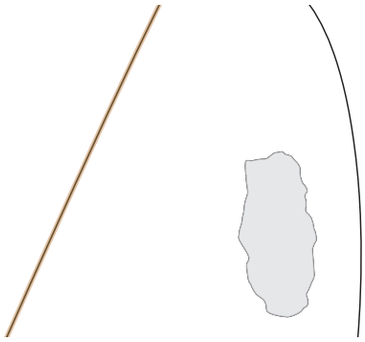
3/ Re-mark the shaper's dots and align the router jig. Tape down securely.

4/ Re-route a new cavity for the plug.

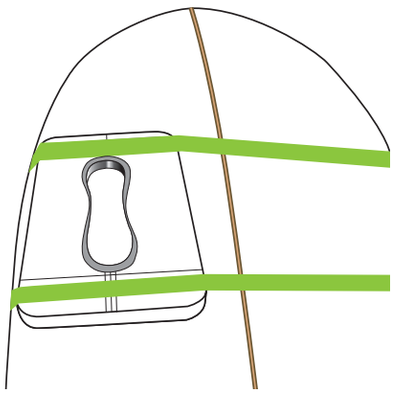
5/ Re-install the new plug as normal.



Pouring in light Q-cell mix.



Q-cell patch sanded back.



Jig taped to the board before re routing the cavity.