

## How to track a 29er mast

By Oliver Scutt

The plastic sail track on a 29er is vulnerable to damage and sometimes has to be replaced. This took a little research, so I thought that I would accelerate the process for others. The job went very smoothly and took about 2.5 hours, not including cure time which is temperature dependent and takes more than 24 hours to reach full strength.

The sail track itself seems to be a hard PVC and the top mast is (I think) some mix of glass, carbon and epoxy. These are not the easiest materials to bond, especially as they have to flex. The adhesive of choice is Plexus MA425. If you can't find Plexus, then 3M 5200 will work too but has to be very clean.

Plexus MA425 is tough, but also expensive. It is made by [itwplexus.com](http://www.itwplexus.com) and is one of a family of adhesives with different strengths and curing times. More comparative details plus the MSDS are here:

<http://www.itwplexus.com/home.html>

Plexus MA425 is hard to find. I paid \$73 US for one cartridge from Jamestown Distributors. In contrast, the track was about \$35.

[http://www.jamestowndistributors.com/userportal/show\\_product.do?pid=4885&familyName=Plexus+MA+425+Long+Open+Time+All+Purpose+Adhesive](http://www.jamestowndistributors.com/userportal/show_product.do?pid=4885&familyName=Plexus+MA+425+Long+Open+Time+All+Purpose+Adhesive)

I bought my 29er track at <http://www.westcoastsailing.net/> whose service is excellent.

You can also buy a fancy mixing gun and nozzle for an extra \$120 or so, but you don't need it.

Plexus MA425 has a shelf life of one year from leaving the factory. My bottle only had 3 months of shelf life remaining when I got it.

I only needed about 20-25% of the cartridge volume, so find a buddy and repair two or more if possible and split the costs.

Plexus MA425 has 45 minutes or so of working time, more at lower temperatures. It is pretty foul smelling, so ideally this job is best done outdoors, or at least in the entrance a building. Once the adhesive starts to cure, then don't fiddle or attempt to move the joint.

There are good general instructions on how to track a mast at CST Composites:

<http://www.cstcomposites.com/How%20to%20track%20your%20mast.pdf>

Another good source was the Swift Solo site, another class that uses a carbon mast with a glued sail track.

You will need:

- Box cutters (aka Stanley knife) to separate track from topmast
- Several spare box cutter blades (you will break the tips off a few!)
- Safety glasses (just in case...)
- Small file (to angle the edges of the new track so that it doesn't catch the mainsail when it is being hoisted)
- Plexus adhesive MA425
- Large 2.5" diameter caulking gun (big enough to hold Plexus cartridge)  
I bought a "Workforce 29oz Professional Caulk Gun" at Home Depot for ~\$20.
- Plastic tubing and a rod to adapt gun to push on both Plexus cartridge chambers simultaneously



- Acetone
- Rag/kitchen roll/paper towel for the Acetone
- Disposable mixing bowl for Plexus
- Spatula
- Ziplock bag (to get mixed Plexus into the syringe)
- Scissors (to cut corner off bag)
- Masking tape (for alignment and clamping)
- Pencil
- Black or clear silicone (to neaten the mast track joint on both sides). This is not easy to find as few people use black in their kitchens or bathrooms. I used a tube of:  
[http://www.fisheriessupply.com/online/In\\_menu/product.asp/mode/1/product\\_id/8581/Ntt/BTL+1142/N/0/Dx/mode+matchallpartial/Nty/1/R/26698/D/%2509BTL+1142/catalog\\_name/FISCO/Ntx/mode+matchpartial+rel+inactive/act/A01/Ntk/All](http://www.fisheriessupply.com/online/In_menu/product.asp/mode/1/product_id/8581/Ntt/BTL+1142/N/0/Dx/mode+matchallpartial/Nty/1/R/26698/D/%2509BTL+1142/catalog_name/FISCO/Ntx/mode+matchpartial+rel+inactive/act/A01/Ntk/All)
- Another pair of hands, especially when you position the track onto the bead of glue
- 1/2" chisel to remove the excess adhesive bead when semi-cured
- Latex gloves when mixing

The process I followed was:

- Remove old silicone caulk that fills the cove and neatens the edge between track and mast. I used a box cutter, and did my best not to damage the mast itself.
- Remove the track by running the box cutter along the mast track joint. I found an area where the track was lifting slightly, then ran the box cutter along for 2 or 3 inches, swapped sides did another couple of inches and ultimately was able to pull the track cleanly off. I'm keeping the old track as it might be useful for future repairs to small sections. The box cutter needs quite a lot of pressure and the risk of slippage is quite high. You will probably break the tips off a few blades. I got through 4 blades doing mine.



- Clean up the residue by gently scraping with a knife to remove both the old adhesive and the remains of the silicone sealant.
- Chamfer the edges of the sail track entry. Mine was cut square and I wanted to minimize the chances of the sail snagging on entry to the plastic track when hoisted, so I put a 1mm chamfer/bevel on the internal edges.
- Clean up the surface of the mast and track with Acetone
- Cut the track to length. I wanted a 1mm gap between the top of the mid-mast sail track and the new top mast sail track so that when the top mast bends backward, the two tracks do not touch. To do this, I filed about 2mm off the top of the sail track to move it up a little.
- Lay the mast out, sail track-side uppermost. Make sure it is well supported and not able to roll at the wrong moment

- Check the new sail track entry aligns with the sail track on the mid mast. If it doesn't, you can put a fiber washer(s) under the new track to bring it into alignment. In my case, the old/original track had needed such padding, but the new one didn't seem to need it.
- Put alignment masking tape at intervals along the mast. These go round the mast (see the picture). See the CST article for details.
- Lay the track down in position and hold it in position with several more pieces of masking tape. Make sure it is straight, aligned with the mid-mast sail track at the bottom, and the halyard sheave at the top. Look along it and adjust the masking tape to hold it straight
- Score along the alignment tapes on each side of the track. Remove the track and peel off the scored centers of the alignment tapes that would be between the mast and the track. These alignment tapes will help you position the track later. Obviously, you don't want to leave any masking tape on the adhesive line.
- Clean the mast again with Acetone
- Note the time. You need to know the time from when you mix the Plexus so that you know how long you can still work the positioning if necessary.
- Mix the Plexus and get it into the syringe. Since I didn't buy the fancy mixing nozzle, I used a plastic cup.
  - o The Plexus adhesive and hardener are mixed in about a 10:1 ratio. The cartridge has two concentric tubes, so you need to be able to squeeze both at once to get the right ratio out of the end nozzle. I used a 4" length piece of PVC tubing and a 4" small diameter rod to push on the two chambers simultaneously
  - o Once mixed, I scooped the Plexus into a Ziplock bag and massaged it into the corner that I was going to cut off
  - o After cutting off the corner of the bag to give it 5mm hole, squeeze the Plexus into the syringe.



- o Check that you are still well within the working time of the adhesive. If not, discard the batch and mix another.
- Use the syringe to lay a 3mm diameter bead of Plexus all along the mast where the track will sit.

- Position the track onto the bead of Plexus, leaving a 1mm gap between the bottom of the new track and the top of the mid-mast track. Make sure it aligns nicely with your previous alignment tapes.
- Using the alignment tapes, plus the top and bottom, push the track down and use more masking tape to clamp the track in its final position. You should get a nice symmetrical ooze of bead down each side of the track. Don't be tempted to remove the excess Plexus yet -- it is easier when semi-cured in an hour or two, depending on temperature. Also, don't touch or move the track once it has started to cure.



- Once the Plexus has started to cure, you can scrape off the excess bead with a chisel. The Plexus turns slightly lighter and yellower as it cures. At 60°F (October in Seattle), mine took about 3 hours to really solidify.
- When the mast is cured, you can lay a thin cove of black mastic down the edges of the sail track to neaten the joint. I suspect this helps stop water getting in and freezing, and also neatens the joint both cosmetically and aerodynamically. My intuition was to minimize the weight up top though.

Hope this helps!