

## Catalina 30 Aqua Lift Muffler Repair

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At some point about a year ago, I noticed that my Aqua Lift muffler was leaking from the exhaust input on the top of the muffler. Like most that notice the issue, I first tried to stop the leak with a number of repair methods that included silicone caulk, a pipe clamp, and various other inappropriate band aids. Finally, at the end of the summer this year, it got too much and I decided to remove the muffler, assess the damage and make a decision to repair or replace.

As with most mufflers that fail, according to the posts and messages I have read, the muffler failed at the input tube, likely due to vibration caused by the exhaust from my Atomic 4. The neck on the tube was crushed by attempts to tighten the hose clamp holding the exhaust on to the input tube. After checking the price for a new muffler \$375 or so from Catalina direct. I decided to see how well I could do in repairing myself before shelling out the extra money for a new one. Here is what I did.

This is the muffler after being removed from the boat and brought to the house for inspection and repair. Note: I had already cut off the input tube prior to this shot and just set it back in place to show how it was crushed. There was simply no more material to support the exhaust connection from the motor.



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Once I had the motor on the bench, I cut off the crushed input and then used a hole saw to enlarge the hole from the outside and pull out the 2 inches or so of input tube that was inside the muffler.

Cut off the input tube from the top of the muffler with a Dremel Tool and a cut-off wheel. This leaves about a 2" tube protruding into the muffler. To remove that, I used a hole saw.



To get a clean hole, I made a template by cutting a hole in a piece of scrap wood and then clamping it over the hole in the muffler. This gave me a guide for the hole saw. I took this picture after the cut was made, so the template hole and the hole in the muffler are now exactly the same size. Before the cut, you could see the tube protruding down into the muffler and about  $\frac{1}{4}$ " of fiberglass material around the hole. That all came out with the hole-saw cut.

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Once the old input tube was removed, I had a pretty clean piece ready to be repaired. Then I decided to start looking a bit closer. On inspection of the corners of the muffler I found some dark lines that looked like cracking beneath the gelcoat. These turned out to be structural cracks in the muffler that were likely seeping water a bit. I never noticed this with the muffler in the boat, but decided that they needed to be addressed. So I started sanding off gelcoat anywhere that I suspected there might be cracking. And I found cracking on three of the four corners.



Here are the pics of 3 of the 4 corners with either cracking just below the outer layer of glass, or pitting in the glass. After some research on this, I found that this is common in any molded fiberglass production. Rounded corners are usually pretty difficult to lay-up in a mold, resulting in trapped air, which over time will result in cracking like this.

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To repair these areas, I first used a Dremel and a small grinding wheel to cut out the bad material. Then I filled the holes with Structural Fiberglass filler from West Marine. This is pretty stout stuff, perfect for these repairs where the back side of the repair is not accessible. The material is Polyester filler with long strands of fiberglass mixed in. Wear a respirator and do this in a well-ventilated area. This product rates a 10 on the organic fumes scale.



In cutting this out, I was careful to cut out only the damaged material, rather easy as it was really rotten. Then I feathered the edges to create as much surface area for the structural filler to attach as I could.



Same holes, now filled with structural filler



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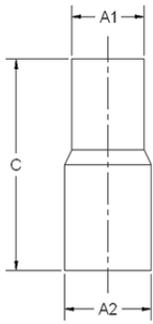
Once these holes were sanded out, I layed up two layers of fiberglass cloth and epoxy over them to provide some additional strength to the corners then sanded the whole thing down. Here is the finished repairs on these areas.



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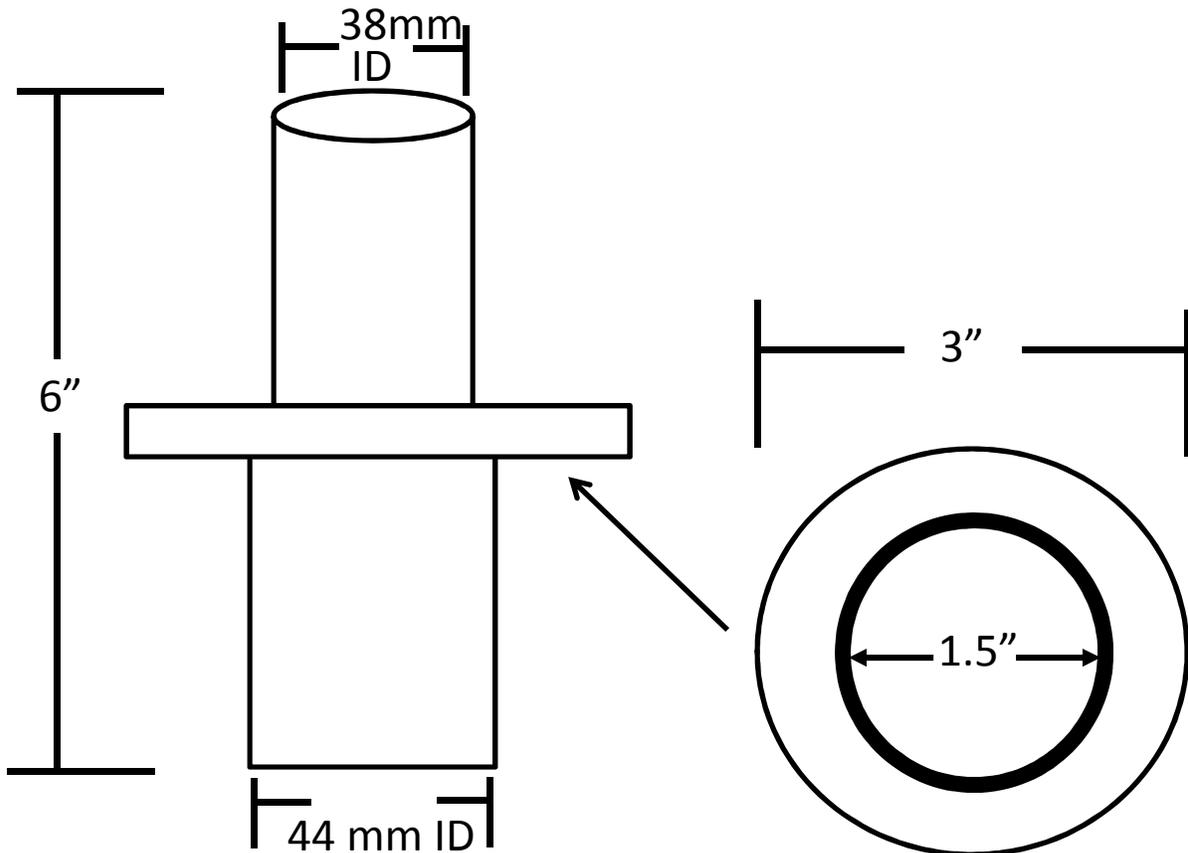
Now time to replace the input tube which started the whole project. I found a new 6" tube manufactured by Centex. I found the tube online and ordered through the nearest marine distributor listed on their site. The tubes are cheap...like \$12.95. My marine supply shipped me two, just because they felt bad about the shipping. Total for the 2 tubes and shipping was about \$50.



REDUCER COUPLING					
A1		A2		C	
NOM. O.D.		NOM. O.D.		LENGTH	
INCHES	MM	INCHES	MM	INCHES	MM
1.50	38	1.75	44	6.00	152

This seemed to be the same design and material as the tube that I cut out of the muffler. Centex part Number 1200435. This is a 38mm to 44mm reducer coupling.

Now I have the part and needed to figure out how to attach it to the muffler from the outside. The key is to attach enough surface area to the muffler so that the attach point is strong and durable enough to withstand the constant vibration from the engine and exhaust connection. Here is my design.

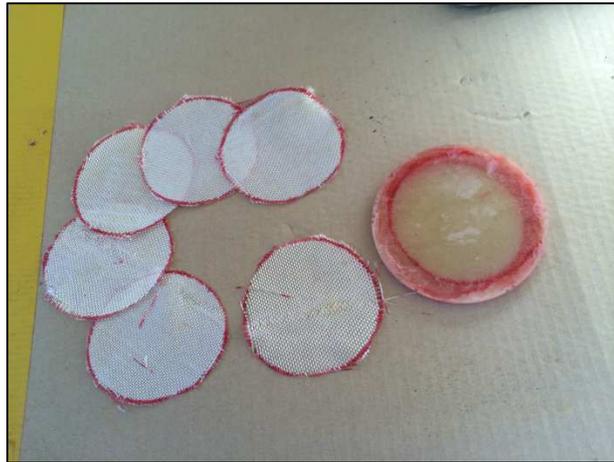


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Here is how I constructed the flanged input tube. First I made the flange out of about 5 layers of fiberglass cloth (cut into a circle) and resin. I used the top to the West Marine marine filler as my mold and just laid-up the fiberglass in that. It ended up being a bit bigger than 3", but I figured if there was more surface area on the flange then it would add more strength to the joint.

Here is a picture of the fiberglass cloth and the molded flange. I used some of these same circles to patch and reinforce the corners of the muffler.



After the flange was complete, I cut out a 1.5" hole in it and slipped it over the new input tube. I glassed these together using first the polyester filler and then finished it with a small amount of thickened epoxy. Here are a couple of pictures of the results.

Now that I had my new tube completed. It was time to attach it to the muffler. I accomplished this using thickened epoxy. I used West System epoxy and thickened with colloidal silicon. I mixed this to the consistency of peanut butter, coated the bottom of the flange liberally and then pressed it into the hole on the muffler, making certain to align the and the new input so that it was as perpendicular to the muffler top as possible.



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Once the new tube was attached to the muffler, I filled any gaps between the flange and the muffler with polyester body filler (Bondo), shaped the flange that hung over the side of the muffler with an angle grinder and a 80 grit flap disk, then sanded the whole part from 80 grit to 220 grit and then primed with Rustoleum Primer. Not my first choice, but considering weather (getting cold) and the ultimate location of this piece (in the bilge) I decided to use something quick and easy. Below is a shot of the primed muffler ready for a final sanding and paint.



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Here is a comparison of what I did to the new AquaLift from Catalina Direct. I spent a total of about \$100, considering materials that I used from what I had on hand plus the purchase of the new input tube. The Catalina Direct replacement is \$375. Proof will be in the permanence and performance of the product. I will update if I have any issues. But I am pretty confident that it will be fine.

In support of Catalina and AquaLift, I spent a heck of a lot of time doing this project. They offer a repair for a little less than a new muffler, when space is an issue (the new design is a bit larger). I did this simply to determine if I could. I was successful. However, if you don't feel comfortable working with fiberglass and other such products, you may want to either have Catalina repair your muffler; get a local shop to do it, or just buy a new muffler. Then again, you now have a guide to assist. It may not take you as long to complete the project.

AquaLift Replacement Muffler - \$375



Repaired Muffler - ~\$100

