

## From ALETES, SM#240 1999 with Jabsco manual pump: Head backflow and Holding Tanks

We have persistently had issues with holding tank backflow to the toilet requiring frequent cleaning or replacement of the joker valve. Additional measures have included the addition of a Jabsco check valve as well as the installation of the "locking" version of the Jabsco manual pump. Three layers of defense could not defeat the backflow problem, apparently due to buildup of crystals on all the backflow preventive devices.

Also, we have experienced leakage at the connections of the riser hoses (both inlet and outlet) where they connect to the tank. As others have noted, that connection on some models is a copper sleeve that is glassed into the tank, and that copper corrodes over time developing pin-holes and associated leaks. Nasty. Band-aid fixes over the years usually held for a time, but the corrosion keeps on working and leaks reappear.

During our latest effort at cleaning and replacing the valves we had a surprise. As anyone who has removed the riser pipe that connects the pump to the tank knows, the contents of the entire riser drain out. Hence it is prudent to flush with a significant volume of water prior to attempting the disconnect. By doing so, the contents that spill into the shower pan are "mostly" clean water. In this last removal, however, the contents of the ENTIRE holding tank spilled into the shower pan (no further description required). So now we are apparently dealing with a third holding tank issue. Time for a major effort in holding tank repair.

The internal workings of the holding tank have always been a bit of mystery as there is no access port and the 3 openings to the tank are rather small, basically 1.5". We have not seen shop drawings or photos of the interior of the tank, but from BB postings, our understanding has been that from the copper sleeve penetrating the fiberglass there is a riser tube in the tank that delivers the waste and spills somewhere near the top of the tank. So before developing a plan of attack for repairs, we removed the deck plate to get slightly larger access to the tank to see what was inside and perhaps determine the problem. Here are the long-awaited photos of the inside of the tank looking down from the deck plate.



*1 copper sleeve*



So as one can see, the copper sleeve also corroded within the tank and ultimately the riser extension within the tank separated from it. Wastes were being pumped into the BOTTOM of the tank, and any disconnection of the riser hose in the inboard side would drain any remaining contents within the tank above the drain sump. One curiosity is why the riser within the tank would loop up and then back down so that the discharge point is low in the tank. We couldn't see but presume there is no vacuum breaker at the top of the loop, so as soon as the contents level would be above the discharge end of the loop, the riser would not drain itself, and in fact become a siphon for backflow. Anyway, since it seemed attached to the tank wall and/or top and we could not get into the tank to disconnect, we could not remove it and it was abandoned in place. NOTE TO OTHERS who have experienced the corrosion of the copper sleeve below the tank - this failure within the tank may be in your future as well.

Mark Erdos on May 3, 2017 posted an excellent description of his fix for the inboard portion of the copper pipe corrosion while leaving the upper copper pipe and its connection within the tank in place. This was not an option for us due to the separation above. So, following his procedure but completely removing the copper, our solution was a continuous piece of sanitary hose from check-valve near the pump all the way to the top of the holding tank, no connections to leak.



We reamed out the hole in the fiberglass with rotary rasp so the tubing would slip through. Flared the top of the hole a bit to receive epoxy resin that would seal around the tubing and ooze down between the tube and the fiberglass. Putty was placed around the internal end of the joint to prevent the epoxy from running out. The resin was delivered to the flared opening at the top of the tube/fiberglass joint by pouring it down a PVC pipe/straw.



*3 Epoxy application straw*



*2 Pump out riser*

After curing we filled the tank with clean water to test for leaks. There seemed to be none. However, overnight there was evidence of a slight leak. We suspect there was insufficient gap between the tube and the fiberglass for the somewhat viscous resin to fully flow and fill. Otherwise, this solution seems good. So now the plan is to remove the tube, ream out the fiberglass a bit more to achieve, say, a 2mm gap between them and once again fill with resin.

Any comments, experiences, words of wisdom appreciated as we plan for this FINAL fix.

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