

Life Empirically

Notes To Self, and Maybe You

Build Your Own DIY Arid Bilge or Dry Bilge System



Manual and automatic bilge pumps, whether submersible centrifugal pumps or remotely mounted diaphragm pumps, cannot completely clear a bilge of water. Typically 1-3" of water remains. In a shallow bilge boat like the Catalina 25 used for this prototype system, this can lead to a substantial volume of water remaining in the bilge. Water in the bilge can cause serious problems on many boats, including causing wood stringers to rot and internal fiberglass blistering. Bilge water is also the primary source of that distinctive "boat smell".

At the time of writing, there are two commercially available products that address this problem, with advantages and disadvantages compared to this DIY system.

The Arid Bilge system is a smart, but relatively expensive system. The more recently introduced Dry Bilge system is smart, but less so than the Arid Bilge, and is much less expensive. The Dry Bilge system appears to leave more water in the bilge than the Arid Bilge system, and appears less robustly constructed than the Arid Bilge system.

Both of these commercially available systems are intelligent, only operating their pumps when

water is detected in the bilge, which results in less power consumption. As a less intelligent and much less expensive alternative, this DIY system runs on a programmable timer, which draws power on a schedule regardless of whether or not water remains in the bilge. Both of the commercial systems appear to not remove the last remnants of moisture from a bilge because they do not use sponges, and appear subject to clogging at their water pickup points. This DIY system can remove the last remnants of moisture from a bilge, does not tend to clog, and costs less than \$100.

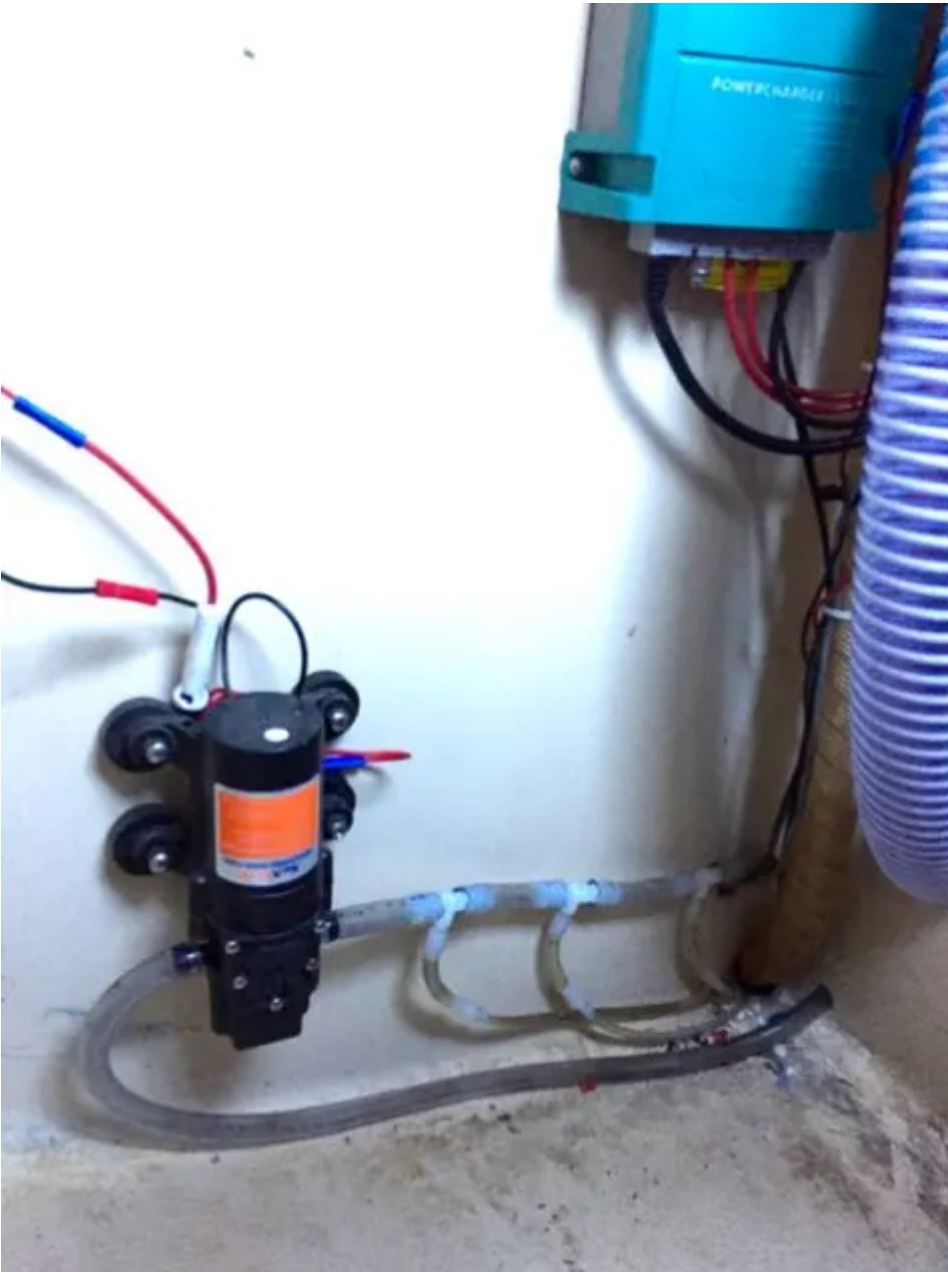
This DIY system starts with common household sponges, which absorb moisture in the bilge areas. The moisture in the sponges is sucked through small feeder tubing, leading to a simple suction manifold, with the suction generated by an inexpensive DC-electric diaphragm pump. The discharge from this pump can be plumbed into the manual bilge pump outlet hose near where it drains to the through-hull at the transom (Plumbing to the hose near the through-hull at the transom may be considered important for safety.), or routed to the lifting cable through-hull on swing-keel boats. The pump is controlled by an inexpensive DC-electric programmable timer, which can be installed on the electrical panel bulkhead. For the prototype installation, the timer was programmed to engage the pump for two minutes every six hours, which resulted in a completely dry bilge in all seasons and weather, regardless of leaks and sailing conditions. In this case, the programming could be changed to pump less, such as for two minutes every twelve hours or one minute every six hours.

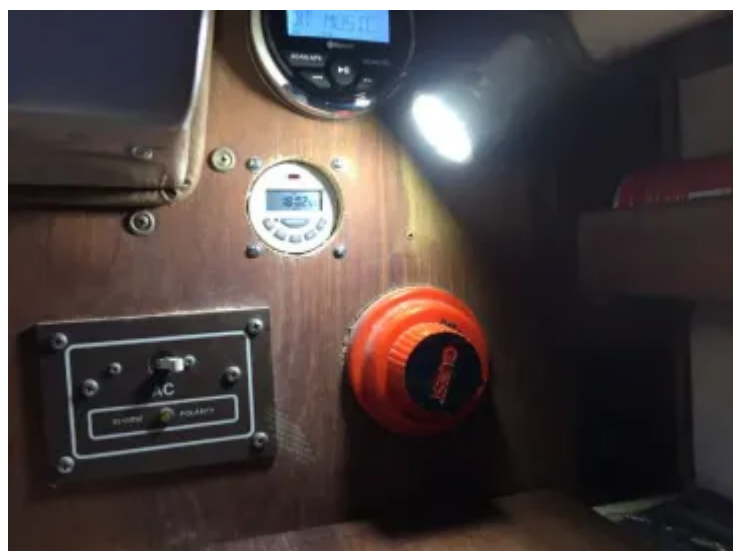
In many boats, there are separate bilge areas in which water typically collects. For the prototype system, there is a separate pickup in each of these areas, a total of three pickups for the system. There is one pickup beneath the forward v-berth, accessible through the wooden hatch beneath the v-berth; one beneath the starboard salon floor, accessible through the small wooden bilge access panel; and one beneath the port salon floor, accessible through the large wooden bilge access panel.

Regarding ongoing maintenance, the pickup sponges need periodic replacement when they begin to deteriorate, at least annually in this prototype system. Allowing the sponges to deteriorate could cause the tubing to become clogged with sponge debris.

A note about pickup-to-manifold tube sizing: four different internal diameter tube sizes were tested, 1/16", 1/8", 1/4", and 3/8". The 1/8" internal diameter tubing yielded the greatest volume of water removed when one of the sponges was wet while one of the sponges was dry, which is likely to occur in this system.







Parts:

- Seaflo 1.2gpm diaphragm pump, available from Amazon.com
- Generic 12v DC timer, available from Amazon.com
- 3/8" clear vinyl tubing, available from most hardware stores, used for manifold, and inlet and outlet to pump
- Rubber stopper, available from most hardware stores, used for capping end of 3/8" suction manifold
- 1/8" clear vinyl tubing, available from most hardware stores, used for line from pickups to suction manifold
- 1/8" to 3/8" plastic barb fittings, available from most hardware stores, used for sponge pickups, and at suction manifold
- Household wall faceplates with center hole, available from most hardware stores, used for mounting sponge, and holding plastic barb fittings to 1/8" tube
- #12 fine thread stainless steel screws, available from most hardware stores, used for mounting sponges to faceplates, and mounting pump to bulkhead
- #6 stainless-steel through-bolts with nuts, available from most hardware stores, used for mounting timer to electrical bulkhead
- Cable ties, available from most hardware stores, used for mounting tubing to existing systems
- 16 gauge wire, available from most hardware stores

A version of this article originally appeared in the November 2017 Catalina Yachts owners' magazine, *Mainsheet*.



Published by sethpool

Entrepreneur Sailor Mechanic Biochemist  [View all posts by sethpool](#)



March 12, 2018

Boat Maintenance, Catalina 25

arid bilge, bilge pump system, dry bilge

55 thoughts on “Build Your Own DIY Arid Bilge or Dry Bilge System”

1. Brandon

says:

January 31, 2019 at 4:29 am

I really like this setup, I have always wanted the Arid, but it is so much money for just a fancy wet vac. My only concern is I am mounting the DC timer in the engine room, does that need to be ignition protected?

1. sethpool

says:

February 6, 2019 at 3:50 am

Do you have propane or gasoline onboard?

2. Shannon Hicks

says:

February 15, 2019 at 4:28 pm

How did you secure the sponge to the faceplate? Also how about the sponge to the bottom of the bilge? Awesome project BTW!!!

1. sethpool

says:

February 24, 2019 at 12:48 am

Hi Shannon, I used sheet metal screws because they have a fine thread and are tapered (pointy)

at the end, which made for good holding in the sponge.

2. Michael Freeman

says:

January 19, 2021 at 12:36 pm

I did this project its great! I spent a little more on the pump and got a fuel lift pump instead there tougher than the cheap water pumps.

1. Chuck

says:

August 29, 2021 at 11:44 pm

What's a fuel lift pump?

3. Dave

says:

March 1, 2019 at 5:01 pm

This is fantastic! Just followed your steps for my forward berth; bone dry!

Quick question... When using three pickups on a single pump, did you have any issues where the pump would draw 90% air vs water from another compartment? (Since it's easier to lift air than water?)

1. sethpool

says:

March 6, 2019 at 12:24 am

Hi Dave, that certainly could be an issue for you. I tested four different tubing diameters: 1/16", 1/8", 1/4", and 3/8". In my installation, I found the best performance with 1/8" tubing. The larger diameter tube would draw too much air. The smaller diameter hardly moved any water.

4. David

says:

March 10, 2019 at 5:31 am

Great project, just to mention i didn't see you include the suction side: T-Connectors 3/8th to 3/8th to 1/8th for each additional suction tube.

5. Cameron Hancock

says:

April 7, 2019 at 3:54 pm

Thanks for creating this. I've had this issue on 2 boats and looked at the Arid system for years but price keeps me away. How did you secure the sponge? I've been testing the system out and understand why you use the 1/8" tubing, great idea!

1. sethpool

says:

March 17, 2020 at 12:00 am

In the test installation, the sponges did not need to be secured to the bottom of the bilge. The sponges naturally rested in place when wet by capillary action against the bilge, and when dry simply by gravity.

1. brickstreetcouk

says:

July 6, 2020 at 2:50 pm

Great system. I'm just building one now.

One question... would it be better to have the pump nearer the bilge or closer to the thru-hull? There's not much lift required, about a foot or so, but the run between the two is about 10 feet.

2. **sethpool**

says:

July 6, 2020 at 7:15 pm

Thanks. It shouldn't matter too much with that short of a run from the pickups to the thru-hull. Theoretically, the system should pump better with shorter pickup tube runs due to the narrower diameter of the pickup tubing compared to the outlet diameter.

6. **Dwight**

says:

April 30, 2019 at 7:52 pm

I can't find the 1/8 couplers. Any suggestion where to find them

1. **scott**

says:

September 21, 2019 at 1:54 pm

usplastic.com

2. **sethpool**

says:

March 17, 2020 at 12:00 am

Local hardware stores should carry them.

3. **Tom Lahey**

says:

March 17, 2020 at 6:53 am

I found them at US Plastics <https://www.usplastic.com/catalog/item.aspx?itemid=42558>

They had all of the plastic parts and hoses at pretty good prices.

4. **Chuck**

says:

August 29, 2021 at 11:42 pm

A place that sells tropical fish and aquariums should have 1/8" tubing, couplings and tees.

7. **scott**

says:

September 21, 2019 at 1:53 pm

Hi, I did this project and works great for one bilge however, when trying to add my other 2 bilges if any one of them dont have water in the bilge they suck air and none off them work. Any ideas? add ing a pump to each bilge isnt an option because they arent ignition protected.

1. sethpool

says:

March 22, 2020 at 10:54 am

What size tubing did you use for the pickups? How far is each run to the suction manifold? You could try a smaller diameter tube for one or more of the runs from the pickup to the manifold. For a bilge area that is usually wet, you also could try larger diameter tubing.

8. Tom Lahey

says:

March 16, 2020 at 4:03 pm

Do you cut away the green fiber part of the sponge where the 1/8" connector touches it?

1. sethpool

says:

March 17, 2020 at 12:00 am

We did not cut away the green fiber part of the sponge.

1. jvisser99

says:

March 25, 2022 at 3:57 pm

Thanks very much for this brilliant DIY project! I had a similar question. I'm trying to visualize the small holes drilled in the side of the 1/8" barb to 3/8" NPT fitting, and how this interfaces to the sponge. Do you think it would work better if you punched a 3/8" hole through the sponge, so the holes in the 3/8" part would be in close contact to the sponge than if the fitting is just pressing against the top of the green scrubber portion of the sponge? Thanks, jv

2. sethpool

says:

March 26, 2022 at 6:35 am

As to your question, yes, I expect it works better with a hole punched or a slit cut in the sponge so that the fitting can go through the sponge. But I have not actually tried it without punching a hole or cutting a slit. Between punching a hole and cutting a slit, I have not observed any difference in performance.

2. Dwight

says:

March 17, 2020 at 8:03 am

I left it on

9. David

says:

May 23, 2020 at 10:25 am

I "stole" your idea and created a very similar system on my Catalina 470. Installed it about 2-3 weeks ago, and have not had the chance to check it again until today, and the bilge is all but dry. There's a tiny bit of water, but that is due to my one pickup being pulled off at an angle by the vinyl tubing – nothing some weight on the pickup won't solve. Thanks for a great write-up!

1. sethpool

says:

May 23, 2020 at 10:54 am

You're welcome. And thank you for the report.

2. Marty

says:

December 23, 2020 at 10:00 am

I am looking to install this on our 470. Questions – did you run multiple suction lines? Particularly behind the access panel between the fuel tanks in the aft cabin. Did you discharge to the shower sump?

1. davidthehoyscom

says:

December 23, 2020 at 10:10 am

Hi Marty,

I run a single line to a pickup in the forward part of the main bilge, and yes, I discharge into the shower sump. I've never seen water near the aft fuel tanks, so never bothered with that area. The single pickup in the main bilge seems to do a great job of keeping it quite dry.

-David

2. Al

says:

April 18, 2021 at 2:50 am

Can you please tell me how to output it to the shower sump?

3. David Hoy

says:

April 19, 2021 at 10:09 am

I ran a flexible PVC line from the pump to a plastic elbow fitting, one that is barbed on one end and threaded on the other. I then drilled a hole in the shower sump lid, just a little smaller than the threaded end, and screwed the fitting into the hole. Then I attached the PVC line to the barbed end. Now water from the dry-bilge pump empties into the sump, and when the sump is full enough the sump drain pump kicks on and pumps the water overboard.

10. Brad

says:

July 16, 2020 at 8:57 pm

Seth – this is an excellent writeup, thank you. I'm wondering – If I have just one bilge to dry, do you think a slightly larger diameter tubing would work better (1/4" maybe)? Thank

1. sethpool

says:

July 16, 2020 at 9:04 pm

1/4" works better if your bilge always has water in it. But 1/4" works less well after your bilge is mostly dry. When the pickup is only sucking moisture from the sponge, 1/8" worked best in our tests.

11. **Brad**

says:

July 16, 2020 at 9:07 pm

Hey Seth, thanks for the quick reply, very helpful. I'm sitting on my boat on Lake Superior right now, thinking about how to make and install your system. Keep up the good work!

12. **Tom Hedge**

says:

August 20, 2020 at 6:29 pm

I can't find any source for the 3/8 to 3/8 to 1/8 tee connectors needed for the manifold connections (I want to have 2 or possibly 3 sponges set up in different bilge areas of my 42' foot boat). Any recommendations?

1. **sethpool**

says:

August 23, 2020 at 6:24 pm

Check small local hardware stores. I found the fittings at my local Ace Hardware.

13. **wefleenor**

says:

September 29, 2020 at 11:22 pm

Made 4 similar units for my boat 6 years ago. I use a normal water switch and used a 2-inch pvc cap for the pickup. I drilled a hole near the edge and inserted a barb fitting. Covered the open end of the cap with a nylon footy to keep out any trash. Only changed the footy once so far.

1. **Jim McMullen**

says:

November 14, 2023 at 5:49 pm

What is a footy?

14. **john**

says:

October 16, 2020 at 12:06 am

Great project and well documented. This is my project for tomorrow. Going to run the output into my gray water shower tanks and let it get pumped out as necessary. Love the simplicity.

15. **Ed**

says:

February 7, 2021 at 1:49 pm

Great article! I purchased the pump you recommended and found that it couldn't pull higher than about a foot when priming, even though it's rated for 4'. What did you encounter with this pump? thanks!

16. **mississauga4sale.com**

says:

June 30, 2021 at 8:00 pm

Thanks for providing this solution in such great detail including the photos, it's a fabulous system!

I installed two pickups, one in the salon and another between our twin engines. I used the wick from my Holmes humidifier instead of sponge and it seems to work well. I've held the wick piece to the switch plate using an electrical cable tie. I used two pumps on each pickup on our boat and hooked up to a single DC timer controller, the one suggested in the article

I've set the timer to come on twice per day for 3 minutes each time.

The system works flawlessly and evacuates all the annoying water in each bilge area

Very happy with the system

Thanks again

Mark

1. **sethpool**

says:

March 26, 2022 at 6:25 am

You're welcome, Mark. And thank you for the report.

17. **Steven J Greig**

says:

July 15, 2021 at 6:15 pm

how do i wire in the switch?

1. **jvisser99**

says:

March 25, 2022 at 4:46 pm

Look here: https://m.media-amazon.com/images/I/41pBm1DVwQS._SL1200_.jpg

18. **Bud**

says:

September 17, 2021 at 5:10 pm

I am installing this set up in my Catalina 42 in the bilge under the Salon floor. I'm testing various configurations. So far two pick ups seems to work best. Still have to figure out what to do when one pickup is suckling mostly air.

I have noticed that pinching the tube that's mostly air raises vacuum in the system. If I clamp it, the other pick up clears all the remaining water.

I'm going to have to experiment with different pick up shapes. The very lowest part of the bilge doesn't have quite enough room for a standard outlet cover.

I could see rigging this system with Blueberry Pi and a moisture sensor. That would automate the whole thing. And you could create a log of how often it runs and for how long.

1. **jvisser99**

says:

March 25, 2022 at 4:43 pm

I was thinking Arduino with an RTC/data logger shield, but it's tough to beat the price on the timer in the article. 😊

19. **Harry S**

says:

March 29, 2022 at 5:04 pm

Great article. I'm going to dump all the non-draining shallow bilge pickups(5) into the sump of the main bilge pump. Thanks for the ideas. Way less \$\$\$ than what I saw at Annapolis sailboat show!

20. **jvisser99**

says:

March 29, 2022 at 6:24 pm

I've started putting parts in online shopping carts for this setup, but, man, those 1/8" hose barb fittings are tough to find. I'm also thinking of putting a couple of 12VDC computer fans into the bilge and wire them to the timer, too, (or maybe another timer) to encourage evaporation to really dry out the bilge.

1. **Frank Smith**

says:

September 22, 2022 at 1:01 pm

I like the idea of using computer fans. I would recommend that you confirm that the fans don't give off any sparks (a/k/a are marine compatible) since they will be in the bilge where gas vapors accumulate.

21. **Lloyd B**

says:

March 30, 2022 at 2:52 pm

for inexpensive tubing and parts look in hardware for flower garden sprinkling systems. Just don't tell him it's for a boat when you pay.

22. **Bob**

says:

April 4, 2022 at 10:09 am

This is a great article as I am trying to do something like this on my Catalina 310. However, the bilge is very small and contains the keel bolts so the area available for the pick-up is only about 2" x 3" in one spot and 1.5" x 3" in another. There are no faceplates that small so what would you suggest? Can those plastic faceplates be cut to size? Thanks.

1. **kwing175**

says:

May 25, 2022 at 11:05 am

A little late to the party but, an old plastic cutting board can be cut to shape and size, Drill requisite holes and away you go. (I love old plastic cutting boards for various inside projects on boats.)

1. **sethpool**

says:

December 6, 2023 at 7:03 pm

You're not late. Blame it on the wind!

2. **Eric Gunnar Ulfsax**

says:

January 20, 2023 at 5:44 pm

Yes, you can cut faceplates very easily.

23. **Phil**

says:

May 12, 2024 at 9:31 am

Thanks for the idea! Here's a write-up of my version: <https://syvagrant.blogspot.com/2024/05/keeping-bilges-dry.html?m=1>

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