

Chapter 8 Plumbing

Water Tank

The 150 gallon water tank is manufactured by:
Coastline Equipment
2235 E Bakerview Rd
Bellingham, WA 98226
Telephone: (360) 734-8509. Ask for Tom.

Tank Vents

Manufacturer

Orcas Marine (now taken-over by Southco Marine):

Southco Marine
Customer Support Center & Show Room
510 Haverty Ct.
Suite J
Rockledge, FL 32955
USA
Ph# (1) 321 638 4990
Fax# (1) 321 638 4979

<http://www.southcomarine.com/orcasmarine/>

<http://www.southcomarine.com/orcasmarine/Deck-Fills-and-Tank-Vents.pdf>

The tank is vented to small chrome flush-mounted external vent, thru 5/8in ID hose, located on the stbd side of the hull, up high in the white part.

Deck Fill

Manufacturer

Orcas Marine (now taken-over by Southco Marine):

Southco Marine Customer
Support Center & Show Room
510 Haverty Ct.
Suite J
Rockledge, FL 32955
USA
Ph# (1) 321 638 4990
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<http://www.southcomarine.com/orcasmarine/>

<http://www.southcomarine.com/orcasmarine/Deck-Fills-and-Tank-Vents.pdf>

The 'O' rings on the filler cap should be replaced every 3 or 4 years.

McMaster sells packs of 100 for about \$8:

Part# 9452K138 BUNA-N O-RING, AS568A DASH NUMBER 133

Fresh water lines

The fresh water lines on our AT are ½ inch CPVC (Chlorinated Poly Vinyl Chloride) pipes. The pipes as well as several fittings (end-to-end, 90 degree bend, 45 degree bend, and end-caps) are available at Lowes hardware stores. They are probably also available at Home Depot or other hardware stores, but when we needed replacement parts, we found them at Lowes. The fittings are attached to the pipes using CPVC purple primer followed by orange CPVC solvent cement.

The water flow starts at the tank with a ¾ inch bronze ball valve on the starboard side (there is an unused plug in the port side of the tank, with a bronze plug). A short length of hose connects to a coarse pre-filter or strainer, then to the fresh water pump, located in front of the tank in the 'Tank Room'. Pressurized cold water flows from the pump forward along a CPVC pipe that runs along the inside of the starboard stringer through the aft engine room bulkhead, under the engine to the forward engine room bulkhead. The pipe makes a 90 degree turn upwards at that point.

A feed is taken off of the pipe that runs up through an electrically-operated valve to supply the windshield washers.

A second feed is taken off of the cold water pipe to feed the hot water heater. These hoses are ½ in FIP thread.

The hot water heater outlet feeds into the start of the hot water pipe which is located along the forward engine room bulkhead near the hot water heater. The hot water pipe on our boat is marked periodically with a strip of red electrical tape.

There are two valves pointing down into the bilge – one for the cold and one for the hot water line located in the forward engine room bulkhead. These are the low points for the water pipes and can be used to drain the system for winterizing or for maintenance.

Feeds are taken off of the hot and cold water pipes and run forward to supply the head. There are hot and cold shut-off valves under the sink cabinet, then the hot and cold lines run to the shower and sink, and cold is run to the Vacuflush head.

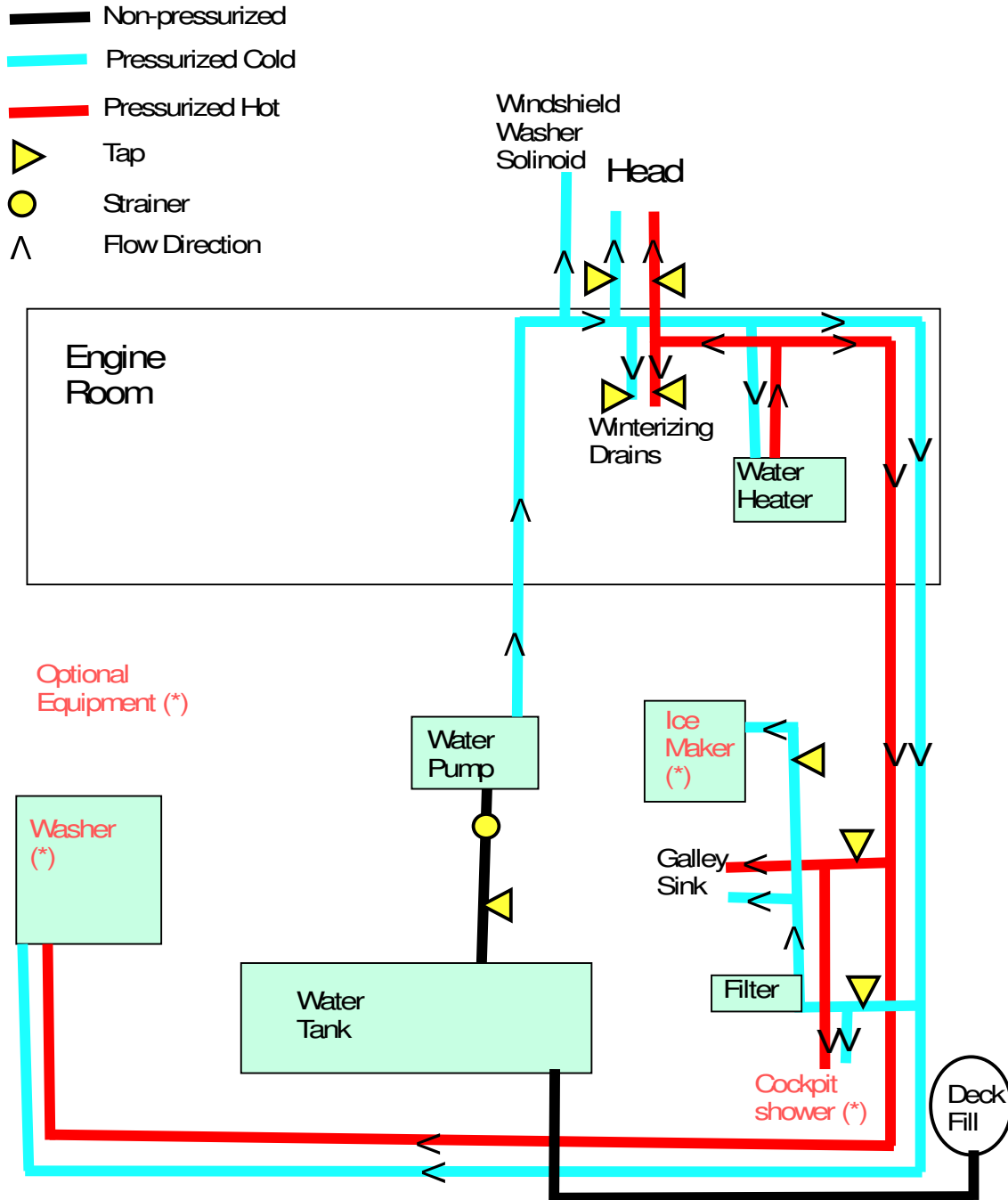
Both the hot and cold water pipes run along the bottom of the forward engine room bulkhead on the starboard side. They take a 90 degree turn aft and run behind the hot water heater along the starboard side of the engine room to the aft engine room bulkhead. The pipes go up and through a large PVC conduit pipe, together with several electric wires and the hydraulic steering lines, along the starboard side of the boat behind the galley cabinets and stove.

From there, both pipes run along to a 'T' junction behind the galley sink, with pipes running up to feed the galley. The pipes continue aft into the cockpit lazarette and are then run along and to the washer/dryer in the aft port salon cabinet (if one is installed) or capped off where the exit into the lazarette if no washer/dryer has been installed.

Under the galley sink, there are hot and cold shut-off valves, and a feed to the cockpit shower (if installed). The cold water feeds through a drinking water filter before being run to the tap. There is also a feed off of the cold water, after the filter, to the ice maker (if installed).

The CPVC pipes are relatively flexible. We had a leak somewhere in the pipes that run from the engine room to the galley sink in the conduit on the starboard side of the boat. After turning off the pressure water and draining the water in the lines using the taps in the engine room, we cut the lines under the sink and in the engine room and removed them by pulling them back into the engine room and bending them up through the hatch. We fed new 10-foot pipes back through the engine room, bending these to get them in through the conduit. We hooked the new pipes up using ½ “ CPVC fittings and the CPVC purple primer followed by the orange solvent cement. We never did quite figure out where the old lines were leaking, but the new ones are not – so we are very happy about that!

The following diagram is a schematic of the fresh water system on an AT34. It is *not* drawn to scale. Optional equipment is denoted in red.



Removable access panels are located in the galley cabinets:

- just forward of the stove
- just aft of the stove (or behind the ice maker if installed)
- galley cabinet under the sink.

Bob Miller (AT34 #036 “Strega”) reports:

“The ½ in fresh water pipe used in the AT34 requires CPVC cement, and is suitable for both hot and cold water. It’s available in Home Depot and Loews. I

think regular PVC cement will work with it, but they also have a solvent that is all purpose and includes CPVC.”

Water Strainer

There is a coarse metal gauze pre-filter between the water tank and the pump that needs to be periodically cleaned. On my boat it is a Shurflo 170-060 attached directly to the input port of the pump. It comes apart two ways: Either

- Push-in and twist the clear plastic body apart or
- Unscrew the winged black plastic connector and unscrew the entire filter from the pump body.

Fresh water pump

The pressure water pump (and also the washdown pump) used to be Shurflo - model 2088-534-344 on older AT34s and model 3901/3902 on the later ones. These have now been superseded with Whale Universal UP1815 pumps because of numerous reported problems with the later Shurflo pumps.

The Shurflo 2208 pump has itself been superceded by Shurflo 3901-2214.

The microswitch gives problems on the Shurflo pumps: a rebuild kit is available. That is the “Switch and Lower Housing”, part number 94-231-10. Its an easy rebuild.

Depco Pump has the best and most knowledgeable tech support on these pumps:

www.depcoump.com (800)446-1656 in Clearwater, FL



The anchor washdown pump is identical to the pressure water pump, and can be used as an emergency spare.

Richard Gray (AT34 #087 “Gray Dawn”) switched to a Shurflo Extreme 4.0 variable speed pump:

“Installed this, replacing the fifth pump in twelve months, the Whale. In the process, I removed the Shurflo accumulator that is not needed with a variable speed motor. This pump is quiet, really quiet. If you open a couple of faucets and run the washer/dryer at has a muted revving sound, kind of like my 1960 Porsche, but under water. Anyway it works and doesn't leak at this point. I live in hope that this is will be the last pump for a while. I'm thinking that our problems on the 34 must be related to the accumulator tank. I don't know why, but if this pump works for a while then maybe we can take the accumulator out of the picture.”

Hal and Ellen Farley (AT34 #073"Good Vibrations") also installed a Shurflo Extreme

“We have AT34-73 and have also had fresh water pump problems. I contacted Shurflo directly and discussed the situation with one of their techs. He sent me an alternate pump from their Extreme Series called a Smart Sensor.

It does not use an accumulator and has a slightly larger footprint. So far so good. We have been using it for about 7 months. ”

If you replace the water pump, especially with a higher-capacity model, keep an eye on the shower sump. The pump in that sump may not be able to keep up with higher water-flows.

I installed a manual pump on “Tardis” as a backup to my electric pump: it’s a Fynspray WS-61 hand pump, installed over the left-hand sink. There is an unused plug in the port side of the water tank, with a bronze plug. I replaced that with a ¾ in ball valve, and fed the hose to the manual pump.

Drinking water filter

There is a purification filter under the galley sink. It is plumbed to filter the cold water going to the galley sink and also to the icemaker (if you have one installed).

My boat, and I think *all* AT34s and 41s, are shipped without the filter element in place. There should be one or two spare elements in the 'miscellaneous spare parts bag' that comes with a new boat.

The earlier boats had a 5" long blue filter under the sink (mine is marked American Plumber W385-PR). More recent boats have a 10" long version. The filter head is the same, so older boats could upgrade to the longer filter. For some reason, the smaller filter elements are much harder to find than the larger ones.

<http://www.waterfilters.net/> seems to carry the replacement item. It’s called a 'sump' on their site.

The replacement filter elements seem to be a generic size. I’ve bought identical ones with ‘American Plumber’ and ‘Culligan’ brand names from both West Marine and (less expensively) from Home Depot and plumbing stores.

Living aboard, we get about one month out of the 'regular' 5in paper/charcoal filters, and three months or so out of a more expensive 'coconut' version. (I’ve no idea what the 'coconut' thing means, but it brings up visions of tropical Pina Colodas in Tahiti...).

The symptom of a blocked filter is a drastic reduction in the water flow from the galley sink cold water tap.

To replace the element:

- Turn off the pressure water.
- Either run a tap to bleed-down the residual water pressure, or push the small red button on top of the filter.
- Unscrew the filter body counter-clockwise, cursing the person who put it on so tight the last time...
- You’ll probably be disgusted with the slimy nasty filter element inside. “Ewww - you mean we’ve been drinking *that* ?”
- I find cleaning the filter bowl with diluted Clorox kills any residual crud, and prolongs the life of the new filter.

Jim Shates (AT34 #047 “Annie's Song”) adds:

“There is also a water pressure restrictor built into the aerator on the faucet assembly. The restriction this causes should be the same for hot and cold. I removed mine because I didn't think it was necessary.”

Water Heater

Manufacturer

Seaward Products
3721 Capitol Ave
Whittier CA 90601
Telephone: 562-699-7997
Fax: 562-699-0908

Mine is a model F1200, with a capacity of 11 gallons. It is installed in the starboard side of the engine room, and heats water either by heat transfer from the engine coolant, or by 120V from shore power (or the generator), using 1500W (about 13A) of AC power. The casing is stainless steel, but the fittings are bronze, and the tank itself is aluminum.

The connection to the CPVC pipes of the boats hot water system is by two 20in long domestic-type water hoses, with ½ in FIP (Female Iron Pipe) fittings.

Mine has an addendum to the owner manual, stating that they now install a zinc in place of the drain valve, on the left front of the unit. However, the manufacturer told me that this is in place of the drain valve, and they only did this for a year or so, as it proved unnecessary (and made Winterizing harder).

I was getting a small 'weeping' of water from the T&P (temperature and pressure) relief valve. According to the manufacturer, this is normal as the tank expands/contracts from the hot/cold water. It is an unusual size: ¾ in, but I was able to get a 1in valve and 1in / ¾ in adapters from a plumbing supply store.

Shower Sump

This is the rectangular plastic box under the head floor. It contains a coarse plastic strainer, a bilge pump and a float switch. The shower and sink drains come together in a T-junction and drain into the box. The other inlet is the anchor locker drain – a nice bit of engineering. The pump discharges via the second of two or four above-water thru-hulls on the port side, roughly abeam of the stateroom stairs. (The forward-most thru-hull is for the forward bilge pump, the next for this sump. If the boat has air-conditioning the third thru-hull is for the condensate drain and the fourth is for the cooling water discharge).

My 2003 AT34 has a Rule 800 gph pump and a Rule Superswitch, but I think that these were temporarily superseded with an electronic switch (a Johnson Pump "Electronic Float Switch"). However, these have had a history of failures, and Tomco switched back to a manual switch (a West Marine 750 gph pump (I think??)).

Larry Morrison reported:

I have the Johnson Pump "Electronic Float Switch". The manual they provide is no help at all. There are two molded circles on the side of the black plastic case.

Just touch (don't press hard) these points with two fingers. If the switch is ok the pump will start. My switch would work when dry, but not under water! It took some missteps, wiring and rewiring before I figured that out.

American Tug 34 Owner Experiences

Save yourself some grief and test your switch under water the first time. The electronic switch can be tested by pressing the black circle area on the switch.

The bad news is that it'll be really gross in there. The good news is that this gross crud would be in the bilge of a lesser boat. This all needs to be cleaned with Softscrub and hot water. Living aboard, I clean mine every two weeks or so.

- Remove the pump and inspect the underside for entangling hair. (If anyone has seen me lately, you'll know that hair belongs to the admiral – not me.)
- Inspect the float switch for clear movement.
- The outlet hose has a check-valve – remove and inspect that. This valve is important because the sump is so small, and the outlet hose so long, that the water that 'drains back' from the hose when the pump shuts off could easily re-trigger the float switch, thus cycling incessantly.
- Run a zip-tie up the inlet manifold and outlet hose to clean them if you can – it tends to clog.
- Reassemble (making sure the check valve is positioned to allow water out only) then flush with clean water through the sink.



You'll probably lose the 'prime' so it may be necessary to fill and manually operate the float switch a few times until the pump drains the sump.

It may take a few tries, but be sure that the pump does *actually drain the sump*.

The following tip definitely meets "Jeremy's First Law of Maintenance", which states: 'Humans are basically lazy. If you want them to do the right thing, you have to make it easy...'

(Incidentally, the Second Law of Maintenance is "Machinery is basically fair. It will almost always give some indication of impending failure, if we're paying attention").



A couple of tips from Randy Guzar (AT34 #095 "Heart Tug"):

"To speed-up (and encourage) cleaning the sump, the 4 screws can be replaced with short studs and knurled nuts. Then the nut can be easily removed by hand and the lid removed, leaving the studs in place"

I used four 8-32 'hanger bolts', which are studs with a wood screw thread on one end (to screw into the sump), and a bolt thread on the other end (so the nut screws on). Ace Hardware part#4315-C (hanger bolt) #854-J (knurled nut). I had to use 2 nuts jammed-together on the bolt to initially screw it into the sump.

The sump discharge tends to 'dribble' and put soap stains on the gelcoat. A short length of hose pushed in from the outside will form a spout, and prevent this. It'll need about a 3in length of hose with an outside diameter of 0.9in."

The pressure water system, and this shower sump, are carefully engineered to be evenly matched in size. At his Admiral's request, Roy Kupkowski (AT34 #39 Mersea") put in a larger capacity water pump. However, this overwhelmed the shower sump pump, and water overflowed into the forward bilge.

After 3 years of living aboard, the outlet hose of our sump had gotten somewhat clogged, and the Rule pump couldn't keep up with the water from a shower, resulting in water overflowing into the forward bilge. We unhooked the pump from the discharge line and used a hose from the dock with a pressure water nozzle attached to flush and back-flush the discharge line repeatedly until it was clear. It probably took 5 or 6 times going back and forth with the water until all of the gunk was blown clear of the line.