



Advice for Designing Custom Polyethylene Holding Tanks

By Zach Richards, Technical Customer Service Lead

This article is intended to help you customize the polyethylene tank you buy from Vintage Trailer Supply. It will help you choose what types of fittings you want and where you want them located on your tank. In addition to a few absolute rules, we've included some informational guidelines. Ultimately, custom tanks are not returnable, so please contact us with any questions before you submit your diagram.

REMINDERS

Our polyethylene tanks use spin welded fittings instead of solvent welded fittings. Spin welding is a way to melt the fitting into the tank using the heat created by spinning the plastic fitting in a hole cut in the tank. Because spin welding requires specialized tools and skills, we highly recommend you let us install the fittings. Spin welded fittings cannot be moved after they are placed.

Before we spin weld fittings into your tank, we will require you to download, mark up, and return to us a diagram worksheet. There are some strict rules on that worksheet and you'll be signing it to give us your consent to begin work. Almost all spin welded fittings are female pipe thread (FPT) but a few tanks may have other types of fittings. The types of fittings available will be specified on the worksheet.

We need you to place your order first and send in your diagram worksheet within two business days after you pay for your order.

Tanks **cannot** be expedited, so allow plenty of time to get your order and worksheet complete, and allow us time to do the welding and shipping. Sometimes tanks ship from our warehouse in Santa Fe, NM and sometimes they ship directly from one of our manufacturers. It can take up to two weeks from the time we have everything approved until we can ship.

Some tanks can be shipped internationally. Check with us in advance.

FRESH WATER TANK TIPS

All fresh water tanks must have at least two fittings: an inlet and an outlet. Some tanks also have separate drain and vent fittings.

Modern fresh water tanks are not pressurized. They use a demand pump to pump the water to your faucets and other fixtures. If you have a separate city pressure connection on your trailer, it must be downstream from the pump and not back up into the tank. If you are using an electric pump immediately downstream from your tank, that pump will prevent downstream water from backing up into your tank. If you don't have a manual hand pump, you will need to install a check valve to prevent the city pressure from entering your tank.

Your tank will be filled through a gravity fill. That means you will be pouring water into the tank through an outside opening. You'll have an **inlet fitting** on your tank for your gravity fill to connect to your tank with a pipe or hose. Inlet fittings are typically 1-½ inch FPT. The part that typically screws into the 1-½ inch inlet fitting is our inlet adapter [VTS-983](#).

The inlet fitting is installed as high as possible on the side of the tank or on the top. If your fill is lower than the top of the tank, water will only flow into the tank up to the level of the gravity fill, and then it will start to flow back out the fill opening. The space inside the tank above that level will not fill.

Your **outlet fitting** is installed as low as possible on the tank and allows water to travel to your pump. It is typically ½ inch FPT. A male threaded straight or elbow SeaTech PEX adapter like [VTS-733](#) or Barbed hose adapter [VTS-591](#) is then used to connect the outlet to the line running to the pump.

Other possible fittings on your fresh water tank might include **a drain** and **a separate vent**.

Drains are run off the line towards the pump (a tee off the line between the tank and the pump), or as a separate fitting in the tank. In either case you will need a valve or some other method of plugging the drain except when intentionally draining the tank. If a separate drain fitting is installed, it should be a ½ inch FPT fitting, just like the outlet fitting. Our [VTS-716](#) is a very simple valve you can use for a drain valve, but there are many other ways to drain.

Venting requires some thought. Venting is essential on a fresh water tank to equalize pressure and to allow the tank to be entirely filled without trapping air at the top. The easiest way to vent is with a self venting gravity fill like our [VTS-482](#). It requires that the cap on the fill not be airtight. With this method, you do not need a separate vent.

If the cap on your gravity fill is airtight like our [VTS-059](#), you will need a separate vent. To create a separate vent, you will need a ½ inch FPT fitting on the top of the tank or as high as possible on the side of the tank. You'll connect a small diameter hose to that fitting and run that hose out of the trailer. When the tank is overfilled through the gravity fill, the vent will serve as an overflow, too.

GRAY WATER TANK TIPS

Gray water tanks hold only your shower and sink water. Not all vintage trailers have gray tanks. They were not standard equipment until the 1970s when it became generally unacceptable to dump waste water on the ground in campgrounds.

All gray water tanks must have at least two fittings. The functions of those fittings can vary. You must have a way to 1) fill the tank, 2) drain the tank, and 3) vent the tank. Two fittings can accomplish all three functions in a simple design, but some applications may require three or more fittings.

Typically, all fittings on gray water tanks should be 1-½ inch FPT. Originally, some gray water pipes in some vintage trailers were 2 inch (inside diameter). We recommend 1-½ inch FPT to make your gray water plumbing easier.

Any fitting on the top or bottom of gray water tanks must be protruding. Fittings on the sides of a tank can, and frequently are, flush recessed because of space restrictions. However, if you do not specify, we will install the protruding version of the fitting.

Having a **vent fitting** on the top face of a gray tank is essential for maximum capacity. We cannot stress this enough. You must have at least one fitting on the top face of your gray tank for venting.

Inlet fittings on gray tanks are often on top. But they can be on the side, too. It doesn't really matter. If your inlet is on the top of the tank, you can use it as a vent as well by teeing off of the inlet pipe between the sink trap and the gray tank. If you do not have an inlet on top, you must have a separate vent on top.

Outlet fittings are easier because you know you want them as low as possible. They are usually on the sides of gray tanks so that the pipes don't hang down below the

chassis. A good trick of the trade is to use a single fitting as both an inlet AND an outlet. You can do this when 1) the 1-½ inch FPT fitting is installed as low as possible on the side of the tank, and 2) there is a separate 1-½ inch vent fitting on the top face of the tank. The gray water will simply flow in and out of the tank through the same hole. Somewhere downstream you will tee the pipe so that one branch runs to the drain and one branch runs up to the sink and/or shower.

It's generally advised to have your gray water storage of a similar capacity to that of your fresh water storage. For added gray capacity, you can use more than one tank in your gray water system. Connecting two or more gray water tanks increases your capacity and is practical as long as you understand that you must have a separate vent fitting on the top of each tank. The two vent fittings can be tied together into one stack pipe as long the vents tee together above the top of the tanks (perhaps in a base cabinet).

Completely draining flat gray water tanks can be a challenge. Because it is desirable to keep the gray water pipes above the belly pan, most gray water systems drain from the side of the tank. This can make it difficult to drain the entire tank. Installing your drain fitting on the rear side as close to the street or curb edge as possible, and as low as possible, can help. Using this configuration (with the drain in a corner) when you go to drain the tank completely (like at the end of the season), you can roll the opposite wheel onto a small block and jack your tongue up slightly to pitch the water towards the drain.

With all 1-½ inch fittings, we recommend threading in our ABS Hub [VTS-892](#) adapter and solvent cementing 1-½ inch ABS pipe into that hub.

BLACK WASTE TANK TIPS

All black water tanks must have three fittings: a toilet fitting on the top, an outlet drain fitting, and a vent fitting.

The top **toilet fitting** should be a flush recessed 3 inch FPT fitting. This will normally accept a 3 inch MPT version of a toilet flange that is screwed into the top fitting on the tank. Depending on the thickness of your flooring, one of our [VTS-736](#) toilet flanges may work.

The **outlet fitting** should be a protruding 3 inch FPT fitting, It is essential to have gravity working with you when draining solids from a black waste tank. For that reason it is ideal to have your toilet directly on top and your outlet drain directly below it on the bottom of the tank. The outlet can be on the side--especially on tanks with sloped bottoms--but keep 3 inch outlet piping to an absolute minimum.

Venting is not required for pressure equalization, but it is required in order for sewer gasses to escape your living area. The **vent fitting** should be protruding and on top so it doesn't get plugged.

Most vent fittings are 1-½ inch FPT fittings. To connect to piping, you will need our ABS Hub [VTS-892](#) adapter. A few tanks may offer a vent connection that is a slip fitting, which allows your 1-½ inch ABS pipe to be slipped inside the fitting and hose clamped.

Rather than a 1-½ inch vent fitting, some people choose a small ½ inch FPT vent fitting in your tank. If you choose the smaller vent fitting, you can use vinyl tubing like our [ITM-591B](#) to channel fumes outside the trailer. In that case, you will screw our [VTS-591](#) barbed adapter into the tank. You'll secure the vent tube with a hose clamp like our [VTS-591G](#).

You can tee your vertical vent stack into your gray water vent stack or run it separately. It is essential to keep the gray and black water separate, so tee together above the level of the waste tanks.

Some vintage trailers diverted a small amount of gray water from the lavatory sink into the black tank. This will quickly reduce the capacity of your black tank so is typically not recommended today.

Email us with questions at service@vintagetrailersupply.com or call us at 800-644-4620.