

RV Sewer Systems



Holding Tanks

So, you've had a wonderful time camping and nature has recharged your energy levels. Now it's time to empty those waste storage tanks and return the contents to Mother Earth to feed her microbes.



If you are new to the world of recreational vehicles, RVs generally have 3 large tanks: the fresh water tank, the grey tank, and the black tank. The fresh water tank has the fresh water – Dah! The grey tank is a sewer holding tank that collects all the slightly yucky water from the sinks and shower. The black holding tank has the wonderful job of collecting all the fun stuff that goes down the toilet.

NOTE: While we are on the subject, the only things going down the toilet are toilet paper and stuff coming out of your body. No paper towels, flushable wipes, feminine products, diapers..... The list goes on – you get the idea.

Our van has an onboard macerator, so the process is slightly more complex with a few additional steps than with gravity dump process which is affectionately known as a “stinky-slinky”. The slinky is a 3 inch diameter accordion type hose that attaches to your waste valve and the other end goes into the sewer drain.

What is a macerator? It is a bladed grinder, very much along the lines of a kitchen sink garbage disposal machine. The advantage of a macerator is that it will grind up any solids into small pieces and push them through a small hose, even going up an incline, a long distance, or up and over into a toilet.

Disadvantage: They are more expensive, need more water in the slurry, and may require maintenance of the blades to clean hair and debris occasionally. They are slower than gravity feed and feel especially slow when you are trying to dump and there are 4 more RVs waiting behind you. Running the pump dry for any period of time can damage the pump or blow the fuse. As an option, you may be able to add a 3 inch stinky-slinky drain and valve to provide an alternative option for dumping in the event of a failure of the macerator.

As long as we are on the subject of RV terms, let's cover a few more:

Blue Boy: an external (blue) waste tank on wheels that can be used for extended stays. It can be transported to the dump station and emptied without the need to unhook the RV and drive to the dump station. It may also be called a honey bucket or tinkle tote. Potable water – that's stuff you can drink.

Dumping Procedure – Gravity Dump

The majority of RVs use the gravity dump process. You need to have the tanks at least 2/3 full to provide “head pressure” and maybe even some syphon action. Position your van in line with the dump receptacle in a slight downhill position if possible. A clear hose fitting will allow you to monitor the flow of all that gross stuff to see when your tank is empty.

1. Always wear disposable protective gloves when handling any components of the sewer system. Harbor Freight sells them by the box at very reasonable prices.



2. Remove the access cover to the tank valves. Inspect the hose O-ring to make sure it's still there or you'll have a mess. (Maybe carry an extra O-ring).



TIP: Dump stations are usually a wet and sloppy mess, so we carry a few pieces of cardboard or newspapers to kneel on while accessing the valves.

3. Attach the hose to the RV valves and twist making sure it's firmly locked in.

4. Extend the hose and insert the other end into the sewer drain, making sure it is secure. Trust me – you definitely don't want this thing to pop out while you are emptying your tanks.

TIP: Many dump stations have a large rock or brick lying there that folks can place on top of their hose to keep it from popping out of the honey-hole.

5. Empty the black tank first by pulling the black valve handle to open the valve.

6. If there is a water faucet at the dump site, you can hookup a hose if there isn't one already, to the tank flush connection and rinse and flush the black tank.



TIP: Purchase a dedicated flushing water hose to be used exclusively for sewer tasks.

Warning: Under NO circumstances do you EVER, ever use your drinking water hose for sewer functions.

7. Close the black tank valve and open the grey tank valve.

TIP: Emptying the grey tank last allows the grey water to flush any black tank waste out of the macerator and sewer hose. If the black and grey tanks are at the same level, some people leave the black valve open to allow the grey water to back flow into the black tank to rinse it.

8. Drain the sewer hose. After both tanks have been emptied, raise the sewer hose at the closest point near the RV and walk it towards the sewer inlet, draining the hose of any water and waste inside the hose.

9. While the sewer hose is still in the sewer, unhook the end from the RV and rinse the inside and outside of the sewer hose.

10. Pack the hose away, dispose of your gloves and wash your hands with soap and water. Just to be doubly safe, I like to use a hand sanitizer after that.

TIP: There's a trick when removing your gloves where you remove one glove and hold it in your hand as you remove the second. It wraps around the first creating a nice little bundle for disposal. Easy to do but hard to explain in text. ;-)



11. Add holding tank chemicals and some water to the black tank. Leave a little bit of water in the toilet to keep the seal from drying out. Also, make sure the sinks and shower P-traps have water in them to block tank odors from coming into the coach through the traps. If they are dry, using the roof mounted exhaust fan may draw odors into the coach.

Warning: OK, one last time: DO NOT use your potable water hose to rinse your sewer hose. There are all kinds of nasty germs growing in that fecal soup.

Dumping Procedure – Inline Macerator

1. Always wear disposable protective gloves when handling any components of the sewer system. Harbor Freight sells them by the box at very reasonable prices.



2. Open the access cover to holding tank valves and hose and unclip one corner of the sewer hose sling.

Tip: Dump stations are usually a wet and sloppy mess, so we carry a few pieces of cardboard or newspapers to kneel on while accessing the hose sling and valves.

3. Hold the sewer hose with the cap facing up to avoid spilling any remaining contents in the hose. Remove the hose cap to allow air into the hose so it will extend.

4. Extend the hose and insert the end into the sewer drain, making sure it is secure. Trust me – you definitely don't want this thing to pop out while you are emptying your tanks. Many dump stations have a rock or brick lying there that folks place on top of their hose to keep it from popping out of the hole.

5. Empty the black tank first by pulling the black valve handle. Press and hold the power switch for the macerator until you hear the tank is empty and the sound of the macerator changes. Release the switch.

Note: As it pumps, the accordion hose may extend even more.

6. If there is a water faucet at the dump site, you can hookup a hose to the tank flush connection and rinse and flush the black tank.



Warning: NEVER, ever use your drinking water hose around the sewer setup.

7. Close the black tank valve and open the grey tank valve. Again, press and hold the power switch for the macerator until the sound changes.

TIP: Emptying the grey tank last allows the grey water to flush any black tank waste out of the macerator and sewer hose.

Note: Some have mentioned that their black valve needs to remain open for their grey to empty properly.

8. Drain the sewer hose. After both tanks have been emptied, raise the sewer hose at the closest point near the RV and walk it towards the sewer inlet, draining the hose of any water and waste inside the hose.

9. Holding the open end facing up to avoid any spills, compress the hose back into its storage tube, screw on the end cap and re-attach the support sling.

10. When you're done, dispose of your gloves and wash your hands with soap and water. Just to be doubly safe, I like to use a hand sanitizer after that.

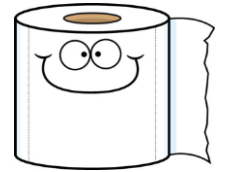
11. Add holding tank chemicals and some water to the black tank. Leave a little bit of water in the toilet to keep the seal from drying out. Also, make sure the sinks and shower P-traps have water in them to block tank odors from coming into the coach through the traps.



Some people suggest that you think of your tanks as a fish bowl.... Huh?

Recreation Vehicle Toilet Paper:

What type of toilet paper can be used in a RV?



RV stores sell special toilet paper for use in RV tanks. You want to look for a rapid dissolving type of toilet paper. If it says safe for septic systems, it may be OK to use. Some big box stores like Walmart sell single ply or even some double ply TP can work. To test it, put some in a jar of water and shake it a few times. If the paper dissolves, you are good to go. If it clumps, don't use it.

If you really have to have the thick, velvety softness of a multi-ply toilet paper, many people use a lidded trash container to receive the used toilet paper. It may sound disgusting, but it is a common practice in many countries around the world. These folks probably have never had to deal with a clogged pipe either.

Recreation Vehicle Toilets:

There is nothing like traveling with your own clean, private bathroom just steps away. No more mapping out rest stops or waiting for the cleaning crew to finish mopping the floor. Now that we have selected our roll of toilet paper, let's put it to good use and dive deep into the toilet operation. Wait, I didn't mean to actually dive into the toilet. It's just a figure of speech.

Camping toilets come in many different configurations. They range from a plastic bag in a 5 gallon Home Depot bucket with a pool noodle for... comfort? All the way to a china bowl with a bidet and a built in macerator. Portable toilets have a water tank and a waste tank that can be detached and emptied into a sewer connection or dumped in a toilet.



SIDE BAR: On a several day rafting trip on the Green River, our guides had a 5 gallon bucket affectionately known as "the groover". For our trip, they had a new and improved version with a toilet seat. A life jacket served as the "bathroom key". If the jacket was not hanging on the bush, the groover was occupied. When on the river, that bucket became the object of many water fights, and the raft that possessed the groover had a distinct advantage when soaking any nearby rafts.

Gravity Flush is the most common type of RV toilet. There's either a lever or a peddle that operates the water valve and dump valve. Pushing part way adds water to the bowl and pushing all the way down opens the valve and the water rinses the waste down into the black tank. Some offer an optional kitchen type sprayer for knocking down those stuck on stinky bits. One disadvantage of the gravity toilet is that it must be located over the black tank.

TIP: "X" marks the spot. Before sitting down to 'doo the doo', add a small amount of water to the bowl and make an X in the bottom of the bowl with two strips of toilet paper. Now you can 'bomb the bowl' and when you stomp the pedal, the paper and the poo-berg will slide easily into the black tank of oblivion and leave the bowl clean and free of 'skid marks'.



Macerator toilets have a garbage disposal type of motorized bladed gizmo, so when you flush, it pulverizes the waste and washes it into the black tank. Macerator style toilets use much more water than gravity drop toilets and also need electricity for the motor. An advantage of a macerator toilet is that it pumps the waste and doesn't need to be located near the black tank. In large Class-A motorhomes, it can even be installed as a second toilet some distance from the black tank. Instead of flushing with a lever or mashing a pedal, macerator toilets have a couple of power switches for fill and flush.

Composting Toilets are an eco-friendly option that is somewhat gentler on the environment. The toilet does not use any water and consists of two tanks; one for solids and one for liquids. You might assume they smell like a two-seat outhouse on a pig farm but I'm told they have an earthy, soil-like smell. A powered vent fan draws air from the waste container to the outside vent stack. You will need to mix in a 'sustainable medium' like peat moss, sawdust or coconut coir (the fibrous material inside coconut shells). Crank handles on the side of the toilet are used to blend and fluff the mixture and I've seen a few people say they raise earthworms in there. Hummm... fishing bait! Composting toilets should be able to go for 3-4 weeks before needing to be emptied. You can expect to pay around \$1,000. Another disadvantage is that they are not good in cold climates – those tiny, little microbes need warmth to live. Also, note – they may be more challenging for the females of the species to use. Earthworms! – Really?



Incinerator toilets are a cousin to the compost toilet in that they don't use water and the waste is collected in a chamber for processing. Instead of microbes doing all the hard work, it has an incinerator that turns the waste into ash. These can be electric or propane powered. Cycle time ranges from 30-40 minutes for the electric toilet to as much as 4 hours for the propane incinerators. During the cooking process, the container can get as hot as 1,400 degrees F and an exhaust vent expels the smoke and fumes. One down side is that they are probably the most expensive RV toilet available, with prices \$2,000 - \$3,500 or more. Another limitation is that during the hour long incineration cycle, you may need to keep your knees crossed while you wait for the cycle to complete.

Bidet Toilet: A fairly recent addition to the RV toilet lineup is the bidet toilet. There are several models in several price ranges. You can opt for a simple seat replacement and water hookup to a full feature, top of the line bidet package with dual nozzles spraying nice warm water where the sun don't shine. Again, they may require electrical power and can set you back over \$1,000. If you like the idea of a bidet on a less expensive budget, portable, battery powered butt showers are available and some will even warm the water for ya.

Locating Dump Stations:

Dump stations can be found in most campgrounds and you can sometimes pay a small fee to dump even if you are not staying there. Other options include: some gas stations like Flying J and Pilot, outdoor stores like Cabela's, some highway rest areas, and many state and national parks. There are phone apps that will direct you to dump stations in your area.

If you've ever been to a RV convention or other large gathering like the Albuquerque Balloon Fiesta, the dump station can come to you. It is known as the "Honey Wagon". Septic companies come to your site and hook up their vacuum hose and suck your tanks dry. For our vans, the cost is a bit high for the small size of our tanks. Some companies charge \$40-\$50 for a friendly, personal pick up.

WARNING: One thing to be careful of with a honey wagon - the suction from these trucks can easily collapse your tanks, so you will need to hold the toilet valve open for air to rush in.

Dump Station Etiquette:

- If other people are waiting to dump, be courteous and skip rinsing your tanks for some other day.
- Make sure your hose is secure in the hole and never dump directly onto the disposal apron.
- Don't put your rubber gloves down the sewer hole. There should always be a trash can or dumpster nearby.

- Don't leave a mess for the next person. Pickup any garbage even if it's not yours, and leave it cleaner than when you arrived.
- Keep a spray bottle of Lysol Multi-Purpose cleaner handy and spray down your handles and other touch surfaces when you are finished.

Side Bar: Most people that have been RVing for a while have a dump station horror story. Mine involved a dump station in an Alabama State Park where, unbeknownst to me, someone had jammed a 2x4 deep down into the sewer dump hole. I sure miss those shoes!

Tips:

- I'm not sure if this still applies to vans with a macerator, but it is recommended to have the tanks 2/3 or more full when dumping.
- Unless you are sure your black tank is super clean, never store it empty. Any solids will dry up and you will end up with a concrete poo-pyramid that isn't easily be removed.
- The best way to store an RV is with the tanks partially full with black tank chemicals in the water (or anti-freeze in winter storage).
- Some companies can clean your tanks with a pressure washer wand to get out that stubborn sludge.
- Some people like dropping in a dishwashing machine soap bomb. They are non-foaming.
- Others have recommended dumping in a bag of ice before you go driving around. One website says this is ineffective.
- If you don't enjoy getting down and yanking valve handles, electrically operated valves are available. They require an electrical hookup and a location for mounting the switches.
- Always use a dedicated black water hose. Some RVers use expandable hoses. Be aware that they are hard to clean and the outer mesh can harbor all kinds of nasties if you drag them through the sludge at a dump station.

Tank Treatment:

RV Tank cleaning is probably the most discussed subject on the web. A Google search for "RV black tank cleaning" resulted in 33 million hits. The van RV tanks are small compared to Class-A, and if you are going to use commercial, off-the-shelf treatment options, you may need to use liquids or powders in place of drop-in pods or capsules, which are sized for larger tanks. Check the labels and avoid any with harsh chemicals and look for biodegradable ones that are safe for the camp ground's septic system.



For black tanks, there are endless discussions about water chemistry, pH, oxygen levels, anaerobic bacteria, obligate aerobic bacteria, hard water, and soft water. Recipes call for a dash of this, and a splash of that to create their own witches' brew. The simplest is to add a cap full of Liquid Rid-X for septic. This will provide good bacteria and enzymes to break down the waste. If you go for a drive before you are going to dump your tanks, add a dishwashing (non-foaming) soap to the black tank.

For grey tanks, combinations of detergent, water softener, borax, etc. seem pretty popular. Bleach is not recommended for tanks since it will kill bacteria in the tanks and damage park septic systems.

Maintenance:

RV sewer systems do need maintenance and repairs from time to time. The built-in macerator used in our RV has a clear plastic cover for visual inspection of the blades. If there is a broken impeller or debris wound up on the blade, you can access it by removing this cover. You may want to consider carrying a spare cover and O-ring since the housing hangs very low under the van and the covers are easily broken. Some people have even constructed metal shields to protect the housing and cover.

Macerators can blow a fuse under heavy load, so you may want to locate the fuse ahead of time and carry a spare.

As a backup dump option in the event of a failure of the macerator, some people have added an additional dump valve to the macerator housing. This enables the use of a stinky-slinky to dump the tanks using the gravity dump method. It also provides an access port to blast any debris from the macerator blades with a high-pressure garden hose nozzle. Removing the glued on cap is a challenging task and a Dremel grinder can help chip away the cover.

Toilet leaks can result from a loose flush mechanism or a dried seal rings. Keeping a little water in the toilet will prevent the flush seal from drying out. Use a toilet brush to remove any debris from the seal that could damage it. A little soapy water in the sewer tanks will keep the dump valves from drying out. Thetford also sells a drain valve lubricant to add to the tanks.



Some people on YouTube have suggested drilling a hole in the valve body for a grease fitting or just spraying lubricant behind the valve blades.

Our dump valves are on the opposite side of the RV from the dump handle and are operated using sheathed cables connected to the valves. If the dump handles are difficult to operate, you can try lubricating the cables with a dry lubricant that contains Teflon or a marine grease like Quicksilver 802859Q1.

Our drain T-handles are held onto the cable using a cotter pin through a hole. If the handle pulls off, you can use a small nail or cotter pin to hold it back on. A better alternative is to replace the handles with the Valterra metal, threaded, screw on handles, part number 1215.1124, available on Amazon.

Another option for hard to pull valves, is to replace them with electrically powered valves. The control switches can be placed in a convenient location, so you don't need to get down on the ground to pull the handles. I like to imagine a remote control that can crack open the black valve slightly to deter tailgaters.

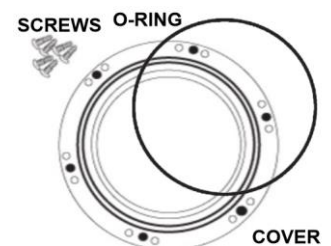
For improved tank ventilation, you can install a Camco Cyclone plumbing vent on the roof vent stack. It weathervanes with the breeze to pull fumes from the tanks.

Sewer Parts:

Thetford Macerator Cover - Part Number 97517



The accordion hose for the macerator seems to be somewhat fragile and pebbles can easily wear a hole through the hose. Replacement access cover and hose: Thetford Hose Kit – Part Number 97521



Installing a Fernco Donut hole where the macerator hose exits the van, the hole size can be reduced and blocked by the Sanicon head. Baffles in the donut can reduce the chance of debris getting caught in the accordion folds of the hose or can help knock debris off. Tie wraps can be used instead of screw clamps. Install shrink tubing over the tie wraps to make a smooth junction.



Camco Sewer Hose Rinser with Power Jet Cleaning



Clear sewer hose attachment



Tank Cleaning Wand



Black Tank Hoses



Camco 22999



RvXplor.US