

Water Filter Trailer Instructions



JEPP built two mobile water filtration units to provide potable water for the shelter and volunteers. They will provide purified drinking and cooking/cleaning water for up to 300 people. The trailer is parked in the JEPP storage shed behind the Joyce Bible Church. The installed water filters cleaned and sanitized the water so well that the systems passed all inspections and tests when Crescent Water District sent samples to the health department. When used according to the steps outlined here, samples will be clean enough for drinking.

How the System Works

- Untreated water is pumped into the designated 250 gallon tote.
- Water in tote is treated with 78% POOLIFE TURBO-SHOCK (specified) calcium hypochlorite and allowed to sit for 60 minutes.
- Alum may be added if the water is silty.
- Treated water is then pumped out of the totes and through the filters and into the 55 gallon plastic treated drums.
- The cleaned water can be used for drinking, cooking, and cleaning.



Steps to Filtering the Water

Note: Please refer to the pictures on the end pages. They will help clarify the parts and steps.

1. The trailer needs to be moved to a spot near the mobile kitchen. (see the shelter map in the Shelter Managers' Handbook).
2. Ask CCFPD No 4 to provide the non-potable water. Source water needs to be as clear as possible to keep sediment from clogging the filters.
3. Follow the safe use of Calcium Hypochlorite procedures, mentioned above, to disinfect the water now in totes. See instructions on the next page.
4. If the water is silty, add Alum.
5. Allow the chemicals to work for 60 minutes. By then, the POOLSHOCK will have sanitized the water and the alum will have settled the silt to the bottom of the tote.
6. Attach the 1 1/2" Gusher Titan 16 gpm manual bilge pump hose to the intake side of the pump.
7. Insert the skimmer/suction hose into the tote. Make sure the suction foot sits above sediment level.
8. Ensure all filters are secure in their housings. Use a wrench to tighten if necessary.
9. Attach the outlet hoses to the outlet on the pump system and then into a 55-gallon storage drum. Outlet hose will be 1" adapted to 1 1/2" by soaking vinyl tubing in very hot water.
10. Make sure the valve at the bottom of the solid blue distribution drum is closed.
11. When all the hoses are in place, use the lever on the bilge pump to move the water through the system. This action pushes the pre-treated water through three 4.5"x20" filters with 1" inlet and outlets. The water goes through a 10 micron filter, then a 1 micron filter, and lastly an activated charcoal filter.
12. The filtered water then flows into a blue storage drum at the back of the trailer.
13. The water in the storage drum can be used as needed by opening the valve at the bottom.
14. Before cleaning another batch of water, make sure the sediments are cleaned out of the totes.

Guidelines for the Safe Use of Calcium Hypochlorite

Calcium Hypochlorite is a chemical used to sanitize water. It is supplied in granular form which is then mixed with water before being added to the non-potable water in the totes to disinfect it. Calcium Hypochlorite raises the pH. The handling of calcium hypochlorite requires the use of personal protective equipment (PPE). Use the equipment and operating procedures to ensure the safe handling and use of Calcium Hypochlorite

Hazards: Respiratory, eye and skin irritation-use PPE.

Required Tools/ Supplies/Materials

- One 270 gallon tote full of undisinfected water.
- One empty 270 gallon tote.
- Calcium Hypochlorite
- A 5-gallon bucket used exclusively for mixing Calcium Hypochlorite
- A non-metallic spoon to mix Calcium Hypochlorite into the bucket of water.
- A long stir stick used exclusively for mixing Calcium Hypochlorite into the tote.
- Personal Protective Equipment (PPE) Gauntlet gloves (rubber/nitrile), Face shield or Goggles. Use of personal protective equipment is mandatory.

Procedure for Safe Use of Calcium Hypochlorite

1. JEPP has stored the calcium hypochlorite on the water trailer and in the file cabinet inside the JEPP Conex located behind CCFPD4's Station #1.
2. Gather all materials needed to perform procedure.
3. Fill the 5-gallon bucket with 2 gallons of fresh potable water.
4. Don the required P.P.E.

Follow the next three steps precisely to safely mix

the granular calcium hypochlorite into the water to disinfect it.

5. Make a concentrated stock of chlorine solution (do not drink this!) by dissolving 1 heaping teaspoon (about one-quarter of an ounce) of high-test (78%) granular calcium hypochlorite for each two gallons (eight liters) of water.

NOTE: SLOWLY SPRINKLE THE SODIUM HYPOCHLORITE INTO THE TWO GALLONS OF WATER. DO NOT DROP THE WHOLE ¼ OUNCE AT ONCE.

DO NOT ADD WATER TO THE SODIUM HYPOCHLORITE. THERE IS A 100% PROBABILITY YOU WILL NOT LIKE THE RESULT IF YOU ADD WATER TO THE SODIUM HYPOCHLORITE.

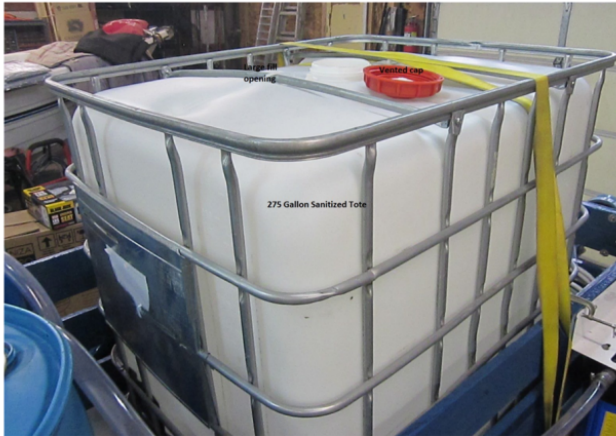
Note: NaOCl comes in various percentages. This recipe is only effective for 78% sodium hypochlorite. Different percentages of NaOCl will require recalculation of the recipe to get the proper chlorine concentration for effective chlorination. Be sure the NaOCl used does not contain by products that will taint the drinking water. POOLIFE TURBOSHOCK is safe to use.

6. To disinfect water add one part of this stock chlorine solution to 100 parts of the water to be treated. That would be one gallon of stock solution to one hundred gallons of water **Use 2.7 gallons of stock solution to treat the full 270 gallon tote.**
7. Stir the water in the tote with a long paddle or stick for 30 seconds to mix in the stock solution.

8. Let the mixture sit for at least one hour before filtering.
9. Follow steps 6-12 in the **Steps to Filtering the Water** section above.
10. The water is safe to drink after filtering. The finished product may taste better if is aerated. Aeration evaporates residual chlorine.
11. Thoroughly rinse and clean the mixing bucket.
12. Return chemicals and mixing supplies to the secured storage.

Photos to Explain Use of the Water Filter System

275 gallon food grade tote with vented cap



Raw water is treated with calcium hypochlorate and allowed to stand for 30 minutes.

1 1/2" pool skimmer hose from tote to pump



1 1/2" pool skimmer hose from treatment tote to 16 GPM hand powered bilge pump



Suction foot with screen and check valve

Raw water is drawn from the tote through the suction foot/check valve via a 1 1/2" pool skimmer hose by a 16 GPM hand powered bilge pump. The large diameter skimmer hose provides additional volume to the pump.

16 GPM hand powered bilge pump



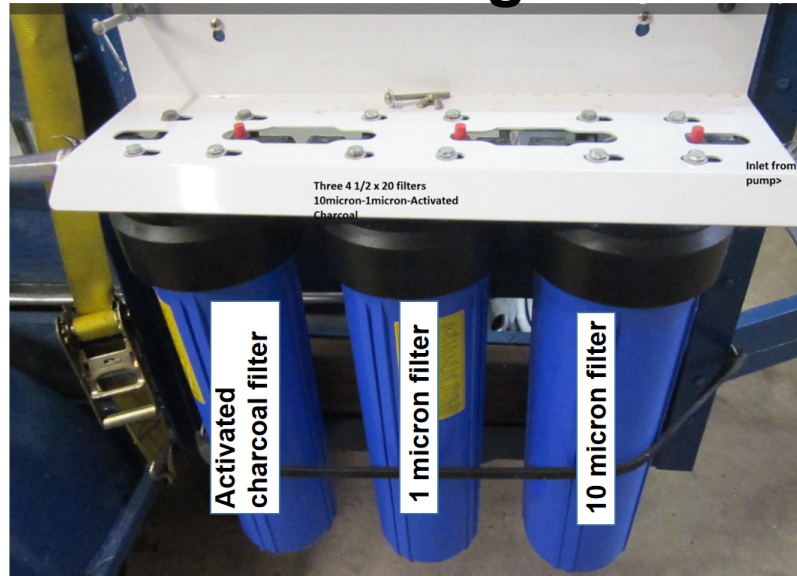
System uses a Gusher Titan BP4402 hand powered bilge pump for operation when electrical power is down. System can be upgraded for electrical pumps when power and pumps become available.

Inlet/outlet fittings for hand pump



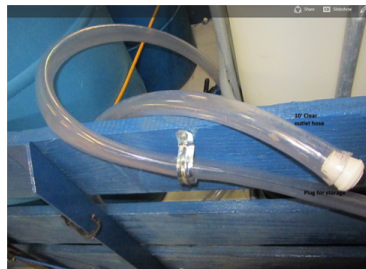
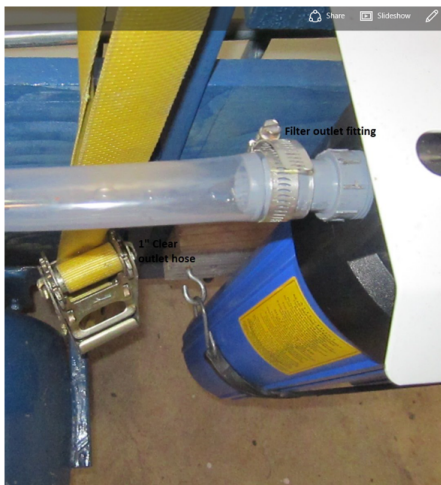
Hoses are reduced from 1 ½" on inlet side to 1" on outlet to increase pressure through the filters.

Filter arrangement



System uses a Triple Big Blue filter housing and bracket (4.5"x20" filter canisters) to improve flow and prolong filter life. The filters are mounted on the passenger side of the trailer to avoid road spray. Each canister is fitted with drain cocks so canisters can be drained before opening. Canisters should be empty for travel. The bungee cord holds the housings against a 2"x6" to prevent vibration during travel. Filters are Big Blue 10 micron, 1 micron and carbon block filters.

Filter outlet and storage/distribution



System uses standard PVC fittings and 10 feet of 1" clear outlet hose to convey treated water from the filters to the storage distribution reservoirs. Storage for this unit is 2 each 55 gallon food grade barrels with standard hose bibs.

Water Trailer instructions video on YouTube: <https://youtu.be/9HDWhLykOc8>