

## Living Water™ Treatment System (LWTS™) Assembly Manual

Have trained personnel ready to unpack and assemble the unit. Remove all items from the metal frames (cages), except for the fiberglass filter tanks.

Note: Ensure that the fiberglass filter tanks remain upright. Do not lay these tanks on their side or roll them. Doing so can cause permanent damage.

Figures 1 through 7 show the parts included.

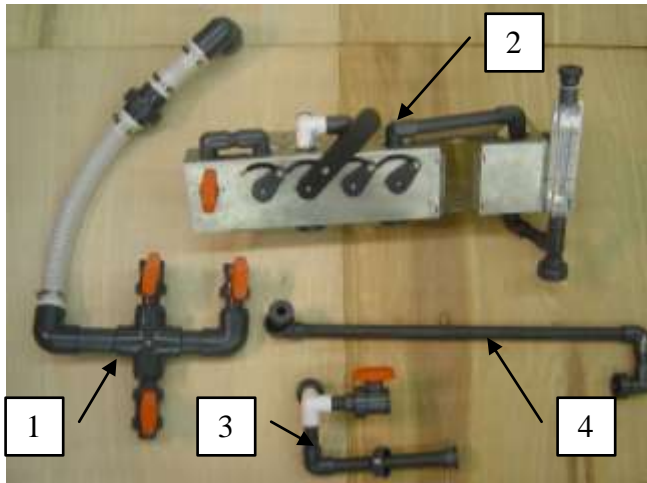


Figure 1: Piping Assemblies

- |                      |                                 |
|----------------------|---------------------------------|
| 1. Backwash Manifold | 3. Chemical Injection Manifold  |
| 2. Valve Assembly    | 4. Tablet Chlorinator Feed Line |

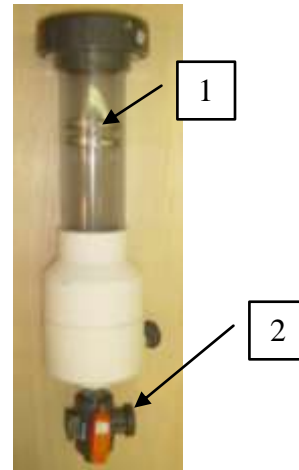


Figure 2: Tablet Chlorinator

- |                      |
|----------------------|
| 1. Mounting Brackets |
| 2. Drain Valve       |



Figure 3: 1.5-inch Suction Hose and 1-inch Braided Hose



Figure 4: Color Coded Sections of 1-inch Braided Hose

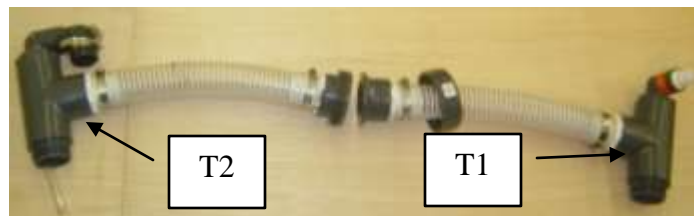


Figure 5: Tank T1 and Tank T2 Top Assemblies

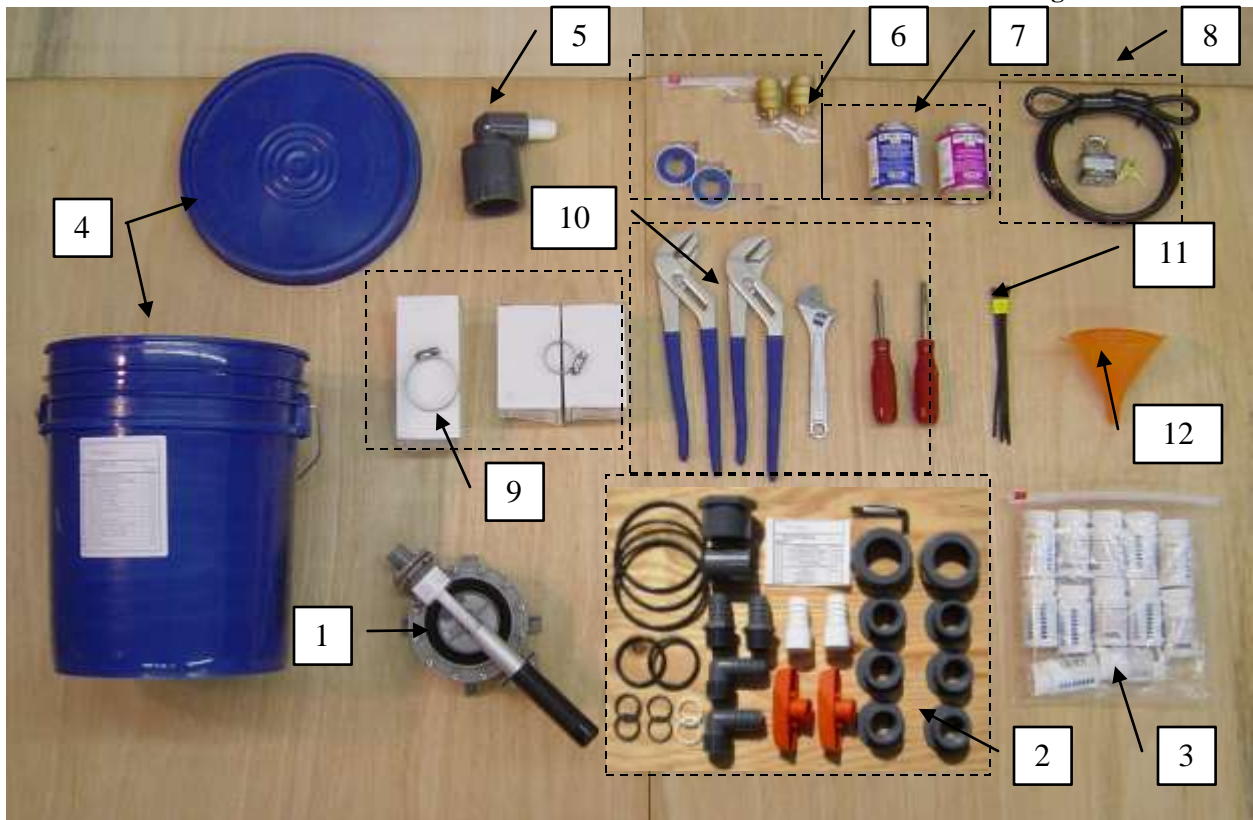


Figure 6: Tool Kit

1. Hand Pump
2. Spare Parts Kit
  - a. 1-1 inch Female Coupling (slip x thread)
  - b. 1-2 inch x 1 inch Reducing Bushing (slip x slip)
  - c. 2-1 inch x 90° Insert Male Adapter (ins x thread)
  - d. 2-1 inch Insert Male Adapter (ins x thread)
  - e. 2-1 inch Insert Male Adapter (ins x slip)
  - f. 6-1 inch Valve Union Connection (thread)
  - g. 2-Valve Handle
  - h. "O" Ring
    - i. 3-Chlorinator Top
    - ii. 2-2" Union
    - iii. 2-1" Union
    - iv. 2-1" Valve
    - v. 2- Teflon Valve Seats
3. Chlorine Test Strips (12 packs of 50 tests)
4. 5-Gallon Bucket & Lid
5. Tank T2 Outlet Fitting
6. Filter F1 and F2 Fittings
  - a. 2- rolls Teflon Tape
  - b. 2-Air Vent Valves
7. PVC Glue and Primer
8. Security Cable, Lock & Keys
9. Hose Clamps
  - a. 10-2 inch diameter
  - b. 20-1 inch diameter
10. Tools
  - a. 2-Channel Lock Pliers
  - b. 1- Crescent Wrench
  - c. 2- 5 in 1 Screwdrivers
11. Zip Ties (10)
12. Funnel

Keep all parts in a designated area to ensure none of the pieces are lost during assembly. Then follow the instructions step by step and refer to the figures for visual help.

### Step 1. Filter Preparation

1. The front of the cage is the shorter side with a large space between the middle vertical bars and a depression at the floor. Position the two fiberglass filter tanks in the middle of the cage, with the Primary Filter, F1, on the left and the Polishing Filter, F2, on the right as shown in Figure 7.



Figure 7: Multi Media Filter Positions

2. Locate the Filter Fittings Bag (found in the Tool Kit). Remove the contents of the bag (see Figure 6 #6). Apply 2 turns of Teflon tape, clockwise, to the threads of the Automatic Vent Valves and screw them into the threaded plugs on the top of F1 and F2, as shown in Figures 8 and 9.

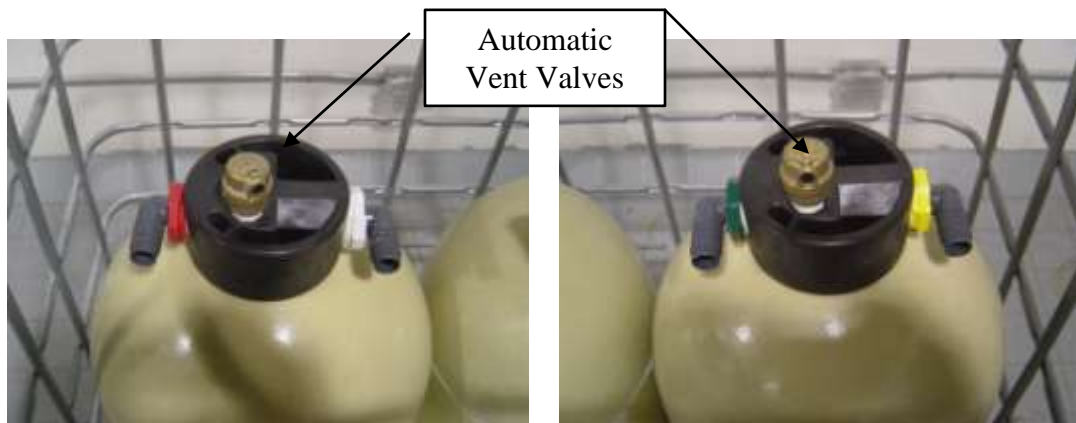


Figure 8: Filter F1 Fittings Placement

Figure 9: Filter F2 Fittings Placement

3. Replace the two metal support bars as shown in Figure 10.



Figure 10: Support Bar Placement

### Step 2. Valve Assembly

The Valve Assembly is designed to fit in a specific place on the front of the cage and will not fit if it is not placed in the proper location. Refer to Figures 11 and 12 for proper positioning. Use the two u-bolts supplied with the Valve Assembly to secure it to the cage.

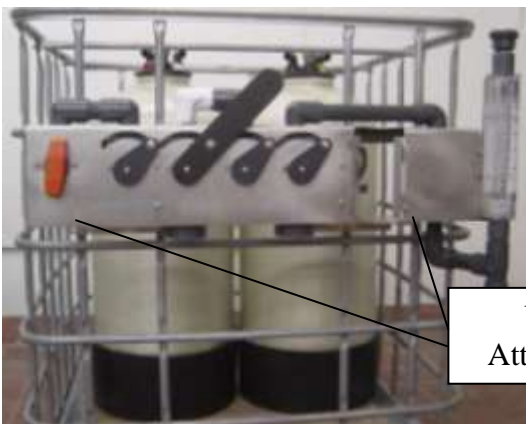


Figure 11: Valve Assembly Positioning

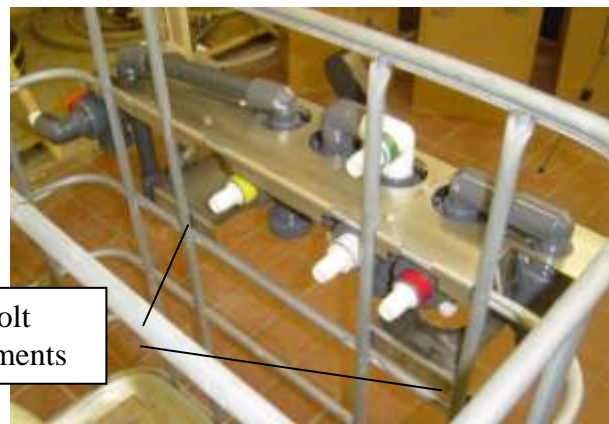


Figure 12: Back Side View of Valve Assembly Position

Next locate the Backwash Manifold, as shown in Figure 13, and the T1 Valve Fitting that connects to the backwash manifold, as shown in Figure 14. Set the T1 Valve Fitting aside until step 5.



Figure 13: Backwash Manifold



Figure 14: T1 Valve Fitting  
(used in Step 5)

Ensure the O-rings are in place on the Backwash Manifold and attach it to the bottom of the Valve Assembly by screwing the coupling fittings attached to the Valve Assembly to the valves on the Backwash Manifold, as shown in Figures 15 and 16. The 2-inch hose connected to the Backwash Manifold slips into a groove located on the left side of the Valve Assembly.



Figure 15: Valve Assembly without  
Backwash Manifold Attached

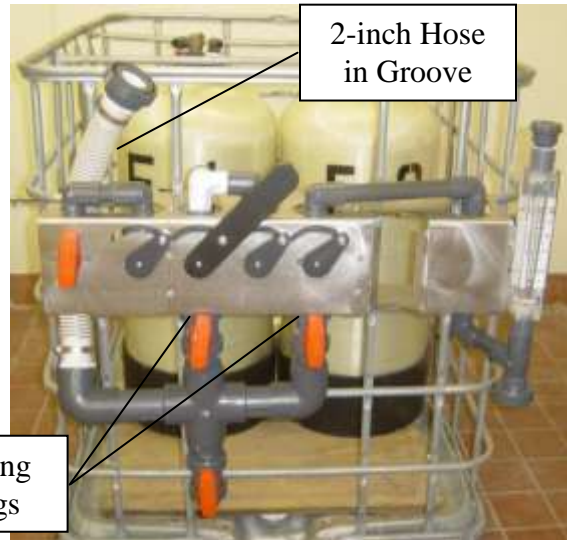


Figure 16: Valve Assembly with  
Backwash Manifold Attached

### Step 3. Tablet Chlorinator, Chemical Injection Manifold, and Tablet Chlorinator Feed Line

Remove the hose clamps from the Tablet Chlorinator column and insert them into the slots on the Valve Assembly Bracket as shown in Figure 17. Mount the Table Chlorinator in the Valve Assembly Bracket as shown in Figure 18. Secure the clamps tight enough to support the Chlorinator, but do not fully tighten yet as the Chlorinator height and rotational alignment will need to be adjusted in the following steps.



Figure 17: Tablet Chlorinator Clamps



Figure 18: Tablet Chlorinator Secured by Two Hose Clamps to the Valve Assembly Bracket

Next mount the Chemical Injection Manifold and the Tablet Chlorinator Feed Line shown in Figures 19 and 20.



Figure 19: Chemical Injection Manifold



Figure 20: Tablet Chlorinator Feed Line

Refer to Figures 21-23 for the proper attachment points for both fittings. When attaching the Chemical Injection Manifold, it may be necessary to adjust the height and rotation of the Tablet Chlorinator.

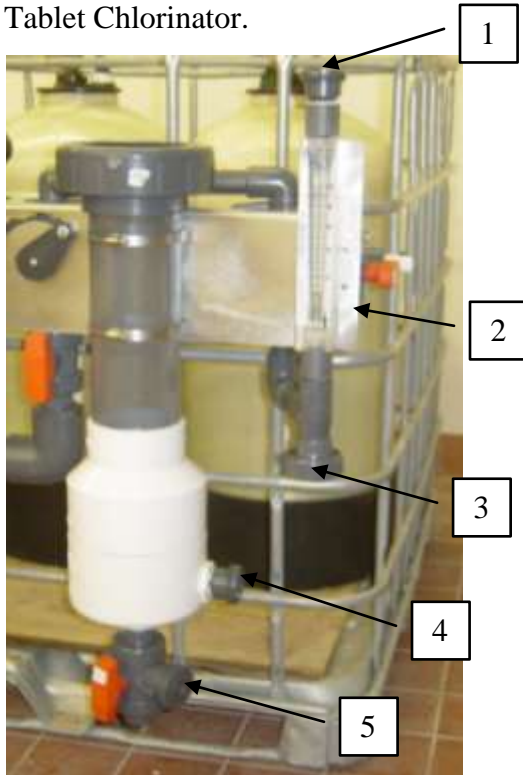


Figure 21: Chemical Injection Manifold and Tablet Chlorinator Feed Line Attachment Points

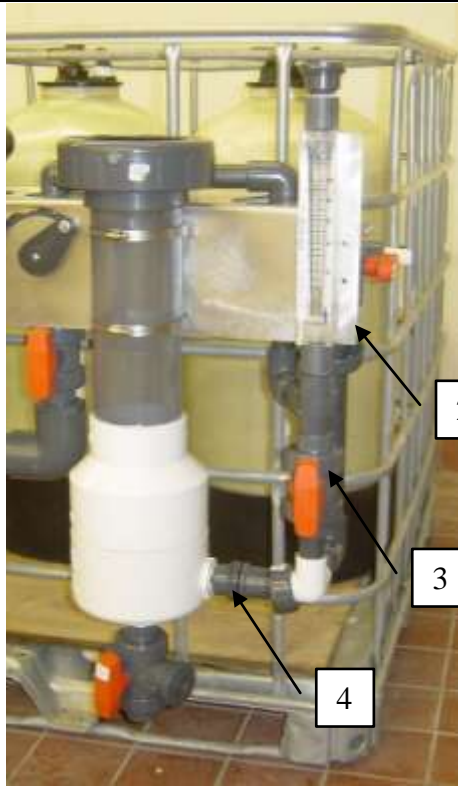


Figure 22: Chemical Injection  
Manifold Attachment  
Points

### Chemical Injection Manifold Attachment Procedure

Note: Ensure O-rings are in all fittings.

1. Connect the Chemical Injection Manifold at attachment point 3. Leave this coupling loose enough to be able to rotate the Manifold.
2. Rotate the Manifold to align it with attachment point 4. (It may be necessary to rotate and adjust the height of the Tablet Chlorinator.) Once the Tablet Chlorinator is properly aligned, tighten the hose clamps that secure it to the Valve Assembly Bracket.
3. Once the Manifold is properly positioned and aligned, tighten attachment point 4 hand tight.
4. Tighten attachment point 3 hand tight.
5. Connect the coupling at attachment point 2 behind the flow meter and tighten hand tight.



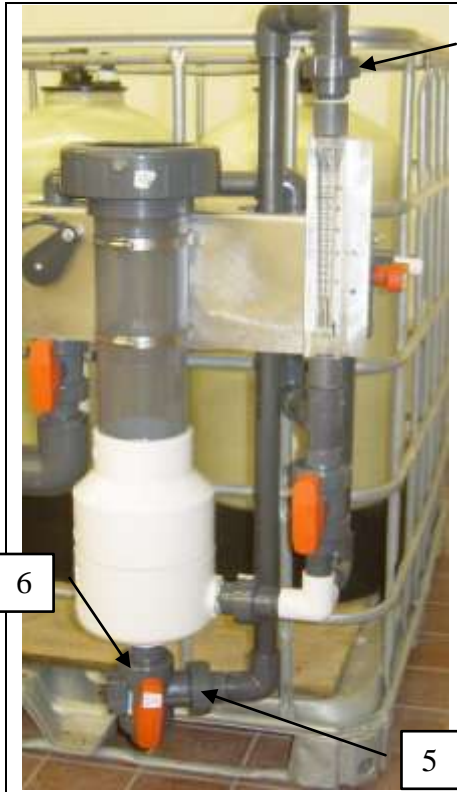


Figure 23: Tablet Chlorinator Feed Line Attachment Points

### Tablet Chlorinator Feed Line Attachment Procedure

Note: Ensure O-rings are in all fittings.

1. Insert the Tablet Chlorinator Feed Line in the hole in the Valve Assembly Bracket, and connect it at attachment point 1.
2. Rotate the Tablet Chlorinator Feed Line to align it with attachment point 5. If necessary, the valve at the bottom of the Tablet Chlorinator can be rotated by first loosening the fitting at attachment point 6.
3. Once the Tablet Chlorinator Feed Line is properly positioned, tighten attachment points 1, 5, and 6 hand tight.

#### Step 4. Hose Connections

Attach the 1-inch color-coded braided hoses to the hose barbs on F1, F2, and the Valve Assembly, matching the color on the end of the hose to the corresponding fitting as shown in Figures 24-26.

Push the hose completely on to the hose barb and tighten the hose clamp with the screwdriver provided in the tool kit. Hoses with one end without a color are drain lines. The end without a color has no attachment point.

Note: If it is difficult to push the hose on to the hose barb, put the end of the hose in hot water for a minute or two. When the hose end is warm and flexible, it will slide easily on to the fitting.



Figure 24: Front View of Valve Assembly Hose Connections



Figure 25: F1 and F2 Hose Connections



Figure 26: Rear View of Valve Assembly, F1, and F2 Hose Connections

### Step 5. Water Storage Tanks

1. Place Primary Potable Water Storage Tank T1 on top of the metal frame containing the filters with the 2-inch valve on the bottom of the tank on the same side as the Valve Assembly.
  - a. Apply Teflon tape to the 2-inch valve on T1 and attach the 2-inch T1 Valve Fitting as shown in Figures 27 and 28.
  - b. Align the T1 Valve Fitting and the 2-inch connection from the Backwash Manifold and tighten the coupling hand tight.

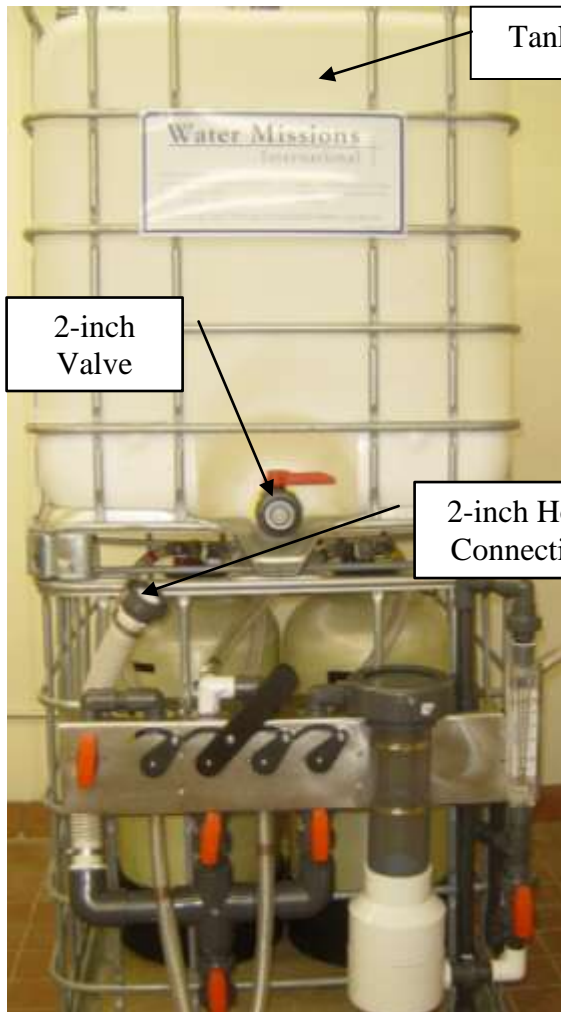


Figure 27: Tank T1 Positioning

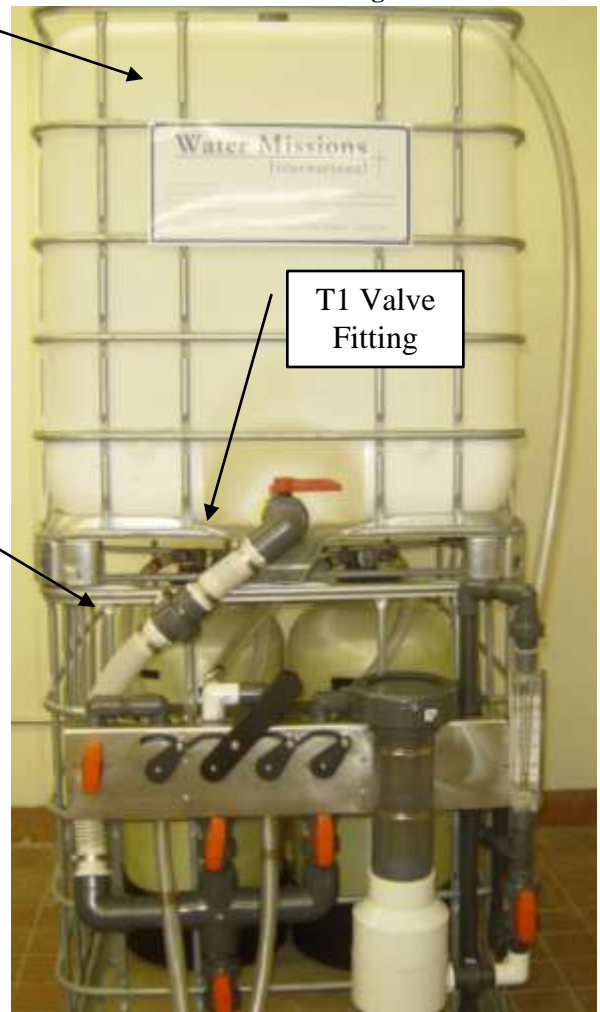


Figure 28: T1 Valve Fitting Connection

2. Position the empty Cage 2 and the Secondary Potable Water Storage Tank T2 adjacent to Cage 1, as shown in Figures 29 and 30. (Note that the valve depression on Cage 2 should be facing the back side of the assembled water system.)
  - a. Attach the T2 Valve Fitting to Tank T2 as shown in Figures 31 and 32.
  - b. Cut a piece of 1-inch braided hose from the roll provided with the LWTS™ and attach it to the T2 Valve Fitting for water distribution. (This hose should be cut to a length appropriate for the specific application.)

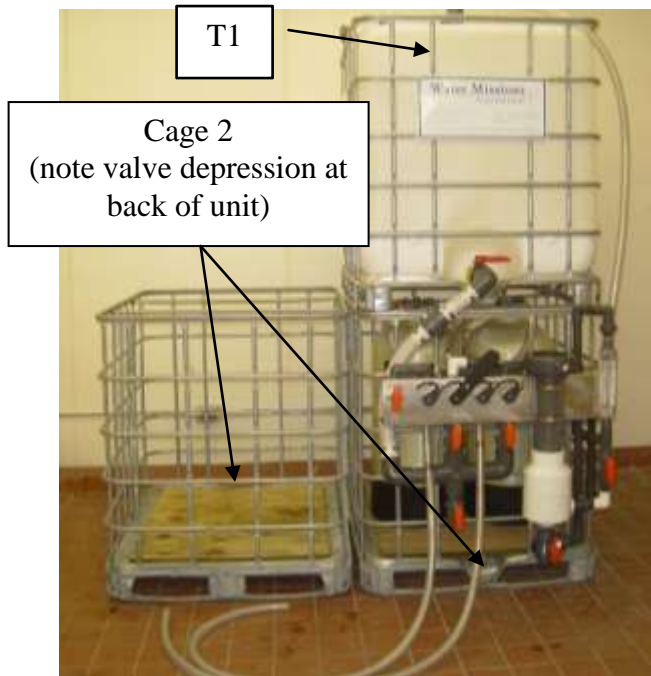


Figure 29: Cage 2 Positioning

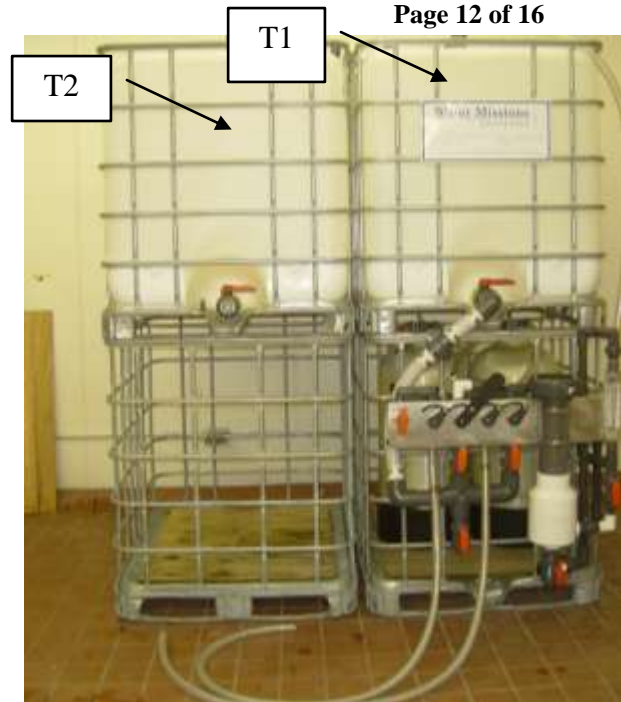


Figure 30: Tank T2 Positioning

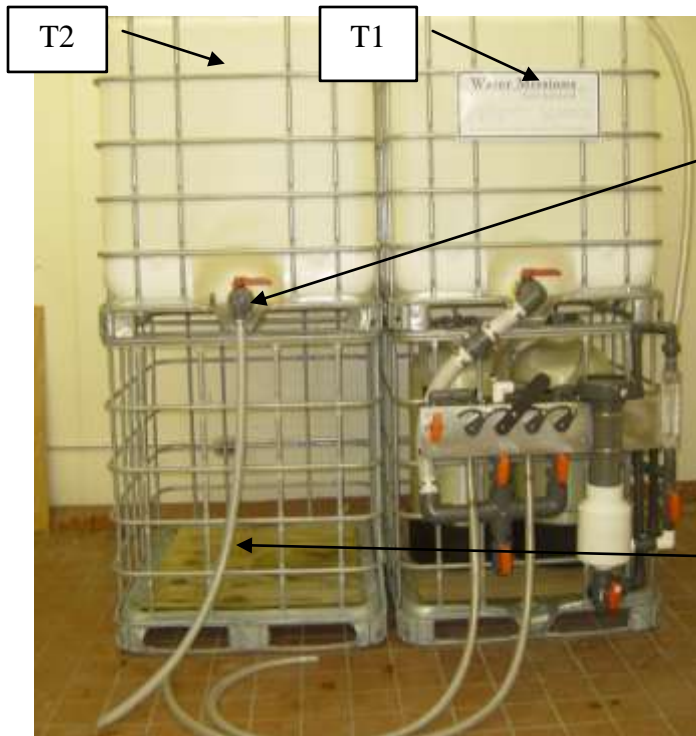


Figure 31: T2 Valve Fitting Attachment



Figure 32: T2 Valve Fitting  
(found in tool kit)

1" Braided Hose cut  
to length from roll

3. Remove the large tops from both tanks. Unscrew the 2-inch plug from the top, and replace the tops on the tanks.

- a. Locate the T1 and T2 Top Fittings shown in Figure 33.

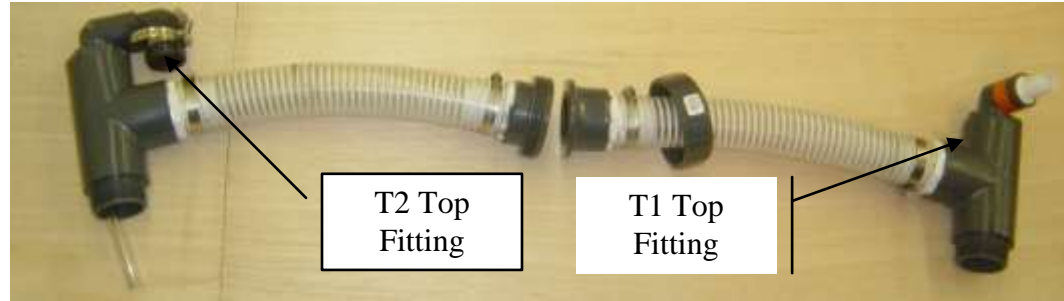


Figure 33: T1 and T2 Top Fittings

- b. Apply Teflon tape to the threads of the T1 and T2 Top Fittings and screw the fittings into the 2-inch threaded holes in the T1 and T2 Tops respectively as shown in Figure 34. Tighten the Tops to the tanks and the Top Fittings to the Tops snugly (these fittings do not need to be hand tight) and align them as shown in Figure 34.

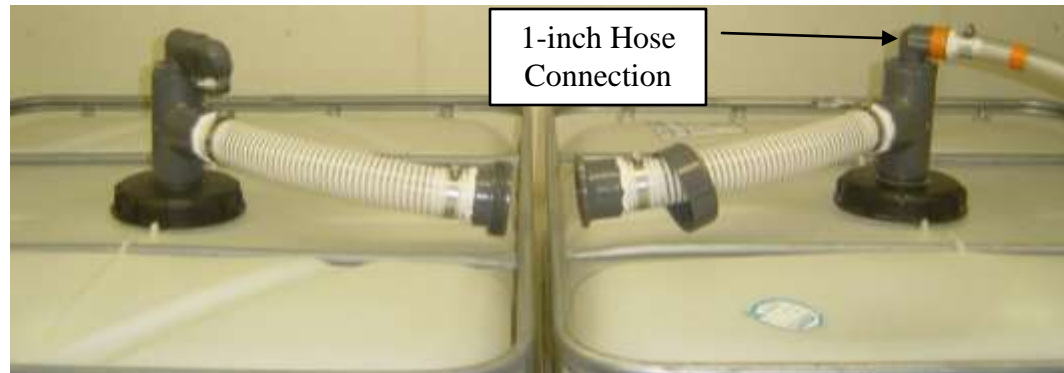


Figure 34: T1 and T2 Top Fitting Positions and T1 Hose Connection

- c. Attach the loose end of the 1-inch hose coming from the Valve Assembly to the 1-inch hose barb on the T1 Top Fitting as shown in Figure 34. See Figures 34 and 36 for additional views of this connection.

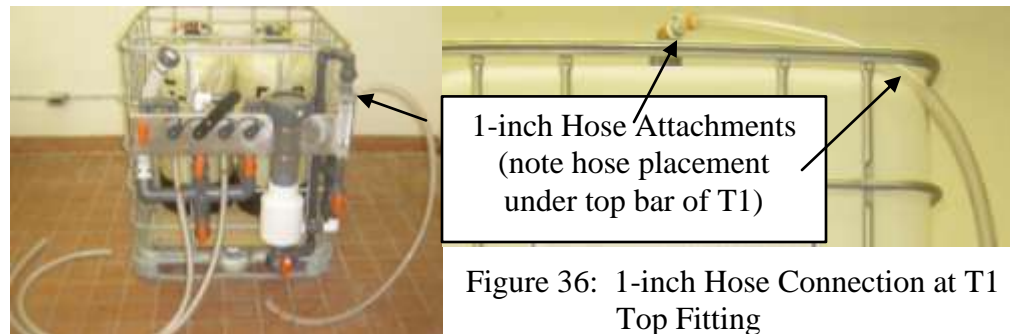


Figure 35: 1-inch Hose from  
Valve Assembly

Figure 36: 1-inch Hose Connection at T1  
Top Fitting

- d. Connect the 2-inch coupling between the T1 Top Fitting and the T2 Top Fitting and tighten hand tight as shown in Figure 37.

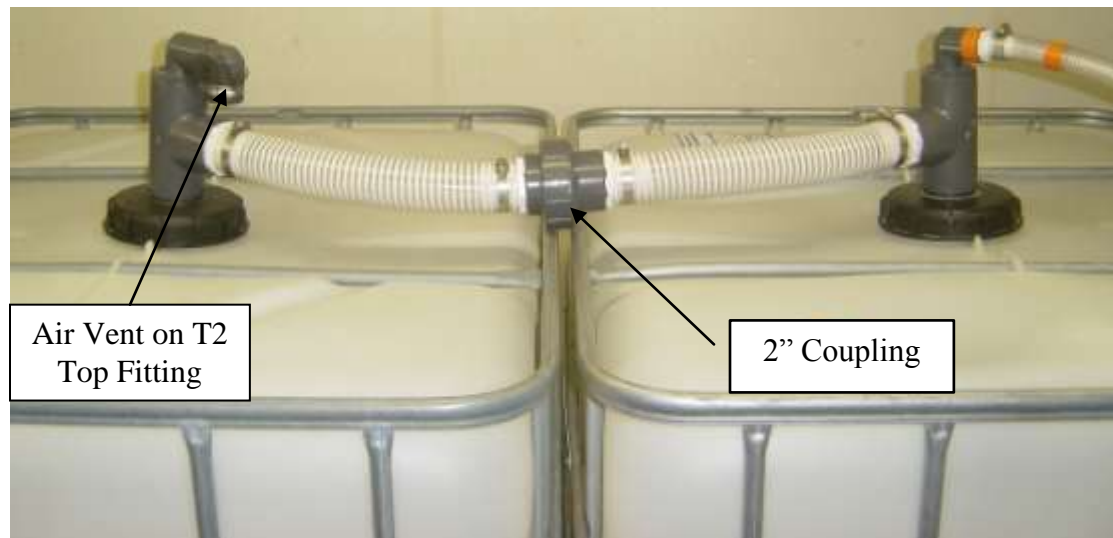


Figure 37: 2-inch Coupling between T1 Top Fitting and T2 Top Fitting

## Step 6. Pump Preparation

Centrifugal pumps can be throttled over a wide range without causing damage, however, there are two important limitations that must be taken into consideration. When setting up the pump, it must be located no more than:

- 15 feet above the water surface
- 30 feet below the LWTS™

### 1. Pump Placement

- a. Locate a suitable place for the pump where the above limitations will be met, and the pump will be secure from rising water and vandalism.
- b. Plan the location of the 1½-inch Suction Line in the raw water source. Whenever possible, the suction screen and foot valve should be at least 18 inches below the water surface, 18 inches above the bottom, and a few inches from the side of the water source in order to minimize the amount of dirt and debris entering the line.

### 2. Pump Assembly

- a. Unpack the pump (see Figure 38) and locate the 50-foot roll of 1½-inch suction hose.
- b. Locate the inlet and outlet fittings in the pump box. Apply Teflon tape to both fittings and screw them into the pump.
- c. Attach the open end of the suction hose to the inlet side of the pump (See Figure 38).
- d. Install the inlet end of the suction hose in the raw water source as planned in Step 1.b above.



Figure 38: Electric Pump

- e. Locate the 100-foot role of 1-inch braided hose. Attach one end to the outlet of the pump (see Figure 38).
- f. Attach the other end of the 1-inch braided hose to the LWTS™ Inlet as shown in Figure 41.

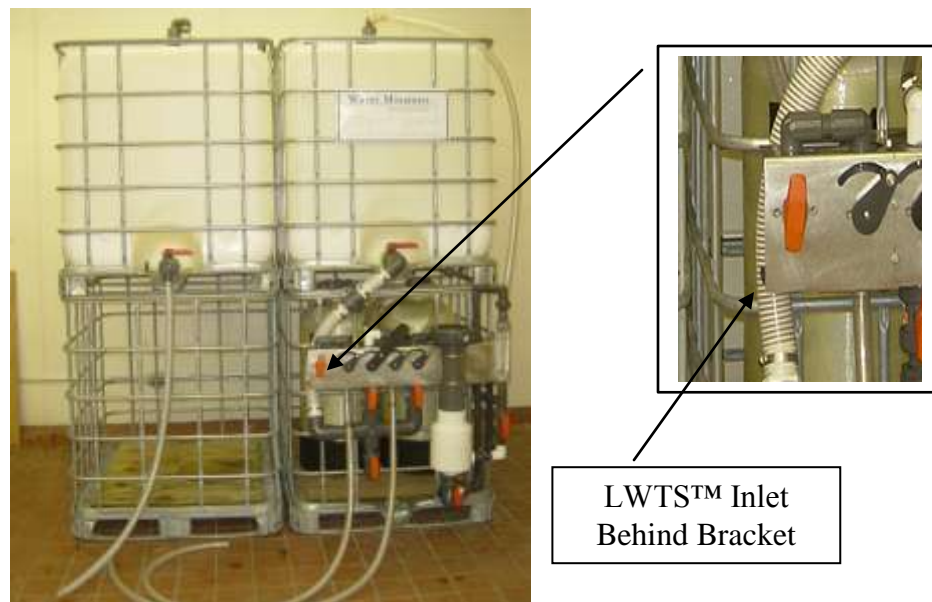


Figure 39: LWTS™ Inlet Connection

### 3. Electrical Connections

**Note:** The pump and switch are pre-wired to operate at 230 volts. If connecting to a 115 volt source, the pump and the switch will need to be rewired. Consult the motor manufacturer's wiring diagram on the motor nameplate for correct wiring connections for the pump and rewire the pump motor and switch accordingly.

- a. See the pump “Installation Operation and Maintenance Instructions” in the Appendix of this manual for correct pump use, requirements, and safety.
- b. Attach the ON/OFF Switch Assembly to any convenient location on the LWTS™ cage using the U-bolts provided.
- c. If the source is 220-240 Volts AC, insert the pump plug into the 240 Volt socket by pushing in firmly and twisting slightly to the right.
- d. If the source is 115 Volt, the plug must be changed

## **CONGRATULATIONS!**

The LWTS™ should now be completely assembled and ready to operate. Refer to the Living Water Treatment System Operating Instructions for detailed instructions to produce safe potable water.

If you have questions, please see our internet website, [www.watermissions.org](http://www.watermissions.org) or contact us by telephone at 1-843-769-7395 (USA) or by postal service at:

Water Missions International  
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Charleston, SC 29417 USA

We pray that this system will be used to provide safe potable water and bring hope to many people for many years.