HydroCycle Vertical Aeroponic Systems

113594: 8' Vertical System (220 Plant Sites)
113701: 4' Vertical System (120 Plant Sites)
READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE YOUR VERTICAL AEROPONIC SYSTEM.

This guide provides helpful hints and important information needed to safely assemble and properly maintain the Grow-Tek Vertical Aeroponic System. Read and understand this guide before you begin.

SAFETY PRECAUTIONS

• Apply pvc primer and pvc cement in a well-ventilated area. Follow instructions on containers.
• Use a portable GFCI (Ground Fault Circuit Interrupter) when working with electric power tools and cords. Use battery-powered tools if possible.
• Exercise caution when using all tools.
• Wear gloves and eye protection when drilling and cutting.

SAMPLE ASSEMBLY PROCEDURE

The steps outlining the sample table system assembly process are as follows:

1. Verify that all parts are included in the shipment. Notify customer service for questions or concerns.
2. Read these instructions and all additional documentation included with the shipment before you begin.
3. Gather the tools and assistants needed to assemble the product.

WARNING: KEEP ALL ELECTRICAL CORDS AND CONNECTIONS OUT OF THE RESERVOIR. CONSULT THE SERVICES OF A QUALIFIED ELECTRICIAN TO ADEQUATELY AND SAFELY CONNECT THE PUMP TO A POWER SUPPLY.

ALL ELECTRICAL CIRCUITS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND REGIONAL BUILDING CODES AND STANDARDS.

TOOLS

The following list identifies tools needed to assemble the aeroponic system. Additional tools may be needed depending on application.

• Tape measure and gloves.
• Marker to mark locations.
• Variable speed drill (cordless with extra batteries works best).
• 1-3/8" to 1-1/2" hole saw bit
• 2-1/4" hole saw bit
• 5/16" and 3/8" drill bits
• Tool to cut pvc tubing
• Ladders to work at the height of system.

BASIC CARE AND MAINTENANCE

Proper care and maintenance of your system is important. Check the following items periodically to properly maintain your aeroponic system.

• Check connections to verify that they remain tight.
• Verify that the pump is working properly.
• Check and clean filter to optimize performance.
• Clean the reservoir periodically to prevent unwanted contamination of solution.
• Monitor temperatures (room and solution) to maximize plant growth.

CUSTOMER-SUPPLIED MATERIALS

The vertical plant tubes require support. Customer is responsible for supplying all the necessary cable and clamps to secure the tops of all grow tubes to the building. Attach 111022 cable hangers (included) to eyebolts near top of each grow tube. Then secure cable hangers to main building using customer-supplied materials to keep tubes stable during operation and harvest.

When supporting cable is installed properly, no weight is on reservoir cover. Tubes should hang from customer-supplied supports to prevent excess stress on reservoir and reservoir cover. Ensure overhead supports are strong enough to support all plant tubes during operation.
Important Information

PICTORIAL GUIDE
Use the following graphics and photos to identify the parts of the system. Consult the Quick Start Guide for additional details and diagrams.

ATTENTION: The 113594 system with 8' grow tubes is shown throughout this assembly guide. The 113701 system with 4' tubes is assembled the same way. When systems are compared, only the length of the grow tubes, mist columns, and the number of plant sites differ.

WF4065  WF1540  WF1390  WF2190  WF3375  LJ2502  WF1033 with 112066 Shut-Off Valve
WF2193  111045  WF1570  WF4790 Key Punch  110077 Air Stone  110829 Drill & Tap Combo
WF8582  112710  113595  112689  113696
**Important Information**

**PICTORIAL PARTS GUIDE—CONTINUED**

- 110725 Air Pump
- 110091 Clear Vinyl Tubing
- 111022 Cable Hanger
- WF6990 PVC Cement and 113372 Purple Primer
- Pressure Gauge
- WR1095 Tape
- 112542
- 112531 Timer*
- 113583 Flotec Utility Pump

**PVC PRIMER & PVC CEMENT**

Follow all directions printed on pvc primer and cement containers. **Purple color of primer does not fade!** Use caution during application to reduce spills and over application at joints.

*Prime all joints before assembly.*

**CAUTION:** Do not activate pump without first priming it. **Doing so will damage the pump!** Consult all documentation included with the pump before you begin.

**WARNING: DO NOT ALLOW THE PUMP TO RUN WHILE RESERVOIR IS EMPTY. DAMAGE TO PUMP WILL OCCUR. MONITOR NUTRIENT LEVEL AT ALL TIMES.**

**ATTENTION:** A timer is required to cycle the water pump on and off. If you did not purchase a timer, contact your sales representative to purchase the 112531 timer.

*Timer not included. Additional purchase required.*

*Reservoir and Lid
*Design of actual items may differ.*
The aeroponic system is ideal for growing in tight spaces. Multiple systems arranged in the same area allow for maximum use of available growing space. However you decide to use your aeroponic system, review the information that follows to better understand how to prepare and setup and system.

1. Review the diagrams throughout this guide to help decide where to set the system. Set the reservoir in place. Allow ample room for cleaning, maintenance, and harvest.

2. Check overhead clearance. Height of 8' system with reservoir is approximately 115”; height of 4' system with reservoir is approximately 75”.

3. Consider system pump location and clearance it will need.

4. Consider where the main power will connect the water pump and air pump.

**ATTENTION:** All electrical wiring to be completed by an electrical contractor in accordance with established electrical codes.

5. System tubes are suspended from the ceiling. Structural members must be strong enough to support the weight of all tubes, full-grown plants, and wet root mass during operation.

**ATTENTION:** Enlist the services of a structural contractor to determine if supporting members are strong enough to support grow tubes.

6. Depending on setting, additional lighting may be required. Ensure that the electrical service can support the addition of artificial light fixtures if needed.

**TIMER REQUIRED**

For best results and to prevent over-heating of the nutrient solution, a timer is required to control the water pump. After populating the grow tubes with plants, set the timer to cycle the pump on and off as follows:

- Run pump for three (3) minutes every two (2) hours.

Monitor the plant growth and solution temperature and adjust watering times as needed to maximize results. **Do not connect the air pump to the timer. Air pump must run continuously for best results.**

**ATTENTION:** The 113594 system with 8’ grow tubes is shown throughout this assembly guide. The 113701 system with 4’ tubes is assembled the same way. When systems are compared, only the length of the grow tubes, mist columns, and the number of plant sites differ.
1. Take the reservoir and locate the dimpled surface on the outside at the high end.

2. Using a **2-1/4" hole saw bit and drill**, drill the hole for the bulkhead fitting. Clean debris from around hole and inside reservoir.

3. Attach WF8582 bulkhead to reservoir. Hex nut and thin flat washer are outside the reservoir. Install thick rubber washer on inside. Tighten until snug using large adjustable pliers.

4. Continue by preparing the lid for system assembly.
2 DRILL DRAIN HOLES IN COVER FOR GROW TUBES

Complete these steps:
1. Place cover on reservoir with porthole positioned at bulkhead end of reservoir. This is the pump end of the system where pump connects to reservoir.
2. Carefully set the assembled supply manifold (113111) on reservoir cover and align union and tee fitting with center of X on reservoir cover.

3. Align union fitting between 2- and 3-tube manifolds with center of raised X. **Verify that no fitting of the manifold contacts any part of the raised X rib of the cover.** See circled fittings in diagram above. Adjust as needed to avoid conflicts with the cover. Keep manifold running parallel with edge of cover.
DRILL DRAIN HOLES IN COVER FOR GROW TUBES—continued

4. With an assistant holding the manifold in place, verify that the end of the manifold is 16-1/2" on-center as shown. Verify that the center of each manifold tube is equal distance from the cover edge. With the manifold held in place, mark the drain hole locations. Actual cover design may differ.

5. Take one 10" grow tube cap (113107) and center it over each proposed hole location to check grow tube position. Verify that cap does not extend onto the edge of the cover in any position. Cap should be inside the edge of raise border of cover. Actual cover design may differ.

ATTENTION: If any part of the 10" cap hangs over edge of cover, set manifold back in position on cover, remark hole locations, and check position with 10" cap. Incorrect hole/tube position is shown in small photo to the right.
6. Remove cover and set on customer-supplied supports for drilling drain holes. **Do not drill cover over the reservoir.** Debris can damage the pump and clog the filter. Use a 1-3/8" to 1-1/2" hole saw bit and drill the drain holes in the reservoir cover. **Actual tank and cover may differ.**

7. Using a 5/16" drill bit, drill two holes in the raised area for the air lines. (Actual cover may differ from what is shown.)

8. Remove all debris from the cover and around all holes to prevent it from dropping into the reservoir when cover is set in place.

9. Continue with the next procedure.
ATTACH THE AIR PUMP AND AERATOR STONES

For optimal system performance and to extend the life of the nutrient solution through increased oxygenation, an aerator pump and aerator stones are included. Position stones on bottom of reservoir opposite main pump. *Air pump must remain above nutrient level to prevent siphoning.*

1. Cut the 110091 tubing in half.
2. Attach one stone to each line and set the stones in the reservoir. See photo for stone position opposite the main pump. Actual stones may differ from the example.
3. Place the reservoir lid on the reservoir, feed tubing up through access holes, and connect free end of each tube to the air pump. *(Actual reservoir cover may differ. Procedure is the same.)*
4. Plug pump into an outlet and check the stones to ensure air is pumping through them. Place stones in a small container of water if needed to confirm operation.
5. Turn off pump after checking the operation.
6. Set the air pump on the cover or inside the reservoir until grow tubes are installed.
7. Continue with the next procedure.

**ATTENTION:** For best results, air pump must run continuously when system is in operation. *Do not connect air pump to a circuit controlled by a timer.*

When in operation, position the air pump at a level that is *above the reservoir at all times to prevent siphoning* of the nutrient solution.
ATTACH 5/16” EYEBOLTS TO EACH VERTICAL GROW TUBE

Complete these step:

1. Take one (1) vertical grow tube and mark the center of the hole that is 16" from end. See dashed line in diagram.
2. Along that line, mark 3” from tube end.
3. Rotate the tube 180° and repeat the steps to mark the same position directly opposite (or across) from the first mark.
4. Using a 3/8" drill bit and drill, drill a hole at each 3" mark.
5. Take the 5/16” fasteners and install in each hole. Place a nut and flat washer on each side of the tube. Distance from tube to eye of fastener is approximately 1”. Tighten until snug.
6. Repeat steps to prepare remaining grow tubes and install 5/16” eyebolts.

5/16” Stainless Steel Fasteners:
FA2101 (5/16” x 3-1/4”) eyebolt, FAME17B (5/16”) flat washers, and FALB12B (5/16”) nuts.
4 INSTALL SEALS, GROMMETS, AND DRAIN EXTENSIONS

Complete these step:

1. Install all 112710 uniseals in the 10” grow tubes. When installed correctly, seals will seat tightly against the outer surface of grow tube.

2. Next, take all 10” grow tube caps (113107) and install one (1) 113595 grommet in each. Carefully start grommet in hole and work it around until grommet is seated flush against lid. Fit is tight.

3. Flip lid over. Verify that collar of grommet is flat against cap surface.

4. Cut one (1) four-inch (4”) drain extension from the 1” pvc tube for each 10” grow tube (e.g., five grow tubes—five 4” extensions).

5. Install one drain extension tube into a 10” cap. Wet drain tube end for easier installation. End of tube is flush with lip of rubber grommet when installed correctly.

6. Repeat to install the remaining drain extensions in the caps.

7. Continue with the next procedure.
SET RESERVOIR AND ASSEMBLE GROW TUBES

Complete these steps:

1. Set reservoir with cover in location where system will operate.

   **ATTENTION:** Choose a location that has adequate space above system and room for system maintenance and crop harvest. Review the Top View diagram above to see grow tube and manifold placement.

2. Take one (1) mist column and carefully twist one (1) 113107 cap with grommet (previous procedure—Step 2) onto threaded fitting at top. Mist column for 4’ system is 113113; mist column for 8’ system is 113112.

   **ATTENTION:** Inspect the mist column to ensure that no mist emitters are damaged or missing. **Consult the procedure to replace damaged mist emitters near the back of this guide if needed.**

3. Seat cap tightly against shoulder of threaded fitting to seal against cap.

4. Wrap threads of mist column fitting with thread tape. Wrap in a direction that will not allow the tape to unwrap when manifold section is attached.

5. Set the 113111 manifold on a level surface and carefully disassemble in to five (5) sections by loosening the 1” unions. See diagrams—right.

   **ATTENTION:** Keep manifold sections arranged as shown so assembly is easier as grow tubes are set in place on the reservoir cover.
6. Take first manifold section and attach to mist column fitting. Hold column with one hand and twist manifold section onto fitting. Tighten until snug.

**NOTE:** Handle manifold sections with care. Do not drop or damage during assembly. *Do not use manifold as a way to tighten connection.*

7. With assistance, take one grow tube and carefully slide cap and column assembly into tube. Turn cap and column so manifold section is perpendicular to eyebolts.

8. Work the cap over the end of grow tube and tap in place with palm of your hand. Do not hit with hammer or anything that could crack the tubing or cap. Verify that cap is seated in place.

**ATTENTION:** Do not cement cap to grow tube! Tube must remain free to remove for system maintenance and cleaning.

9. Look into grow tube through plant sites and verify that mist nozzles align with plant sites. Adjust/turn mist column as needed. Loosen manifold, turn mist column, and retighten manifold.

10. Take one cap with drain extension (Procedure 4) and install on bottom of grow tube. Seat in place with palm of your hand. *Do not cement!*

11. Set the grow tube assembly aside.

12. Repeat this procedure to assemble all remaining grow tubes. Use the diagrams on previous page when attaching manifold sections.

13. After attaching a manifold section to each assembled grow tube, continue with the next procedure.
install the 111045 elbows in grow tubes

Once all grow tubes are assembled and a manifold section is attached to the top, install all 111045 elbows. Wet the end of the 111045 elbow and insert it into the 112710 uniseal. Install all elbows so the open end points toward the top of the grow tube (where manifold is attached) as shown in the photo at the right.

Attention: Seat elbow tight against the uniseal to prevent leaks.

Verify that all elbows are seated tight against seal.
INSTALL GROW TUBES AND CONNECT MANIFOLD SECTIONS

Regardless of the system, grow tubes do not rest on reservoir cover. They are suspended from the ceiling over the reservoir using 111022 cable hangers clipped to the eyebolts. Only drain extension tubes are inserted through drain holes in the reservoir cover to return nutrient solution to the reservoir.

ATTENTION: The customer/installer supplies materials to anchor cable hangers to structure. These are not included. Contact your sales representative to purchase additional fasteners and materials or purchase locally. Contact the services of a qualified contractor to ensure the structure can support the weight of the grow tubes and fully grown plants with a saturated root mass.

Complete these steps:

1. Locate all 111022 cable hangers and clip one to the top of each grow tube assembly as shown.

   ![Image of grow tube with cable hanger]

   NOTE: Turn eyebolts as needed to match the example shown above. Verify that no cable interferes with manifold.

2. Check all eyebolts to ensure nuts are tight.

3. Review information and diagram at right and continue with the procedure on next page.

   ![Diagram of suspended grow tubes]

   ATTENTION: When suspending the grow tubes, ensure that all weight is supported by the 111022 cable hangers.

   No weight should rest on the reservoir cover.

   Additionally, suspend all grow tubes at the same height. This prevents unwanted stress on the supply manifold assembly connected to the top of the aeroponic system.
Use the diagrams below to set the grow tubes in place and to connect/reassemble the manifold. Remember to suspend each grow tube at the same height. When routed correctly, no cable will contact any part of the overhead supply manifold. Complete these steps to set and secure the grow tube assemblies.

1. With assistance, lift the first grow tube and manifold assembly onto the cover. Have an assistant guide the drain tube into the drain hole of the cover. Use Diagram A to choose the first grow tube to set in place.

2. Suspend the tube from the overhead supports using customer-supplied materials and the cable hangers. Verify that manifold is oriented correctly to connect it to the next grow tube.

3. Check to ensure grow tube is suspended above the cover. No weight should be on the cover.

4. Repeat steps to install all remaining grow tubes. Remember to suspend all tubes at the same height. See diagram on previous page.

5. After suspending grow tubes and reconnecting all manifold sections, assemble the main plumbing and pump and connect it to the overhead supply manifold.
Install the plumbing from the reservoir to the overhead supply manifold using the components shown.

**ATTENTION:** Wrap all threaded fittings with thread tape before assembly. Use pvc primer and pvc cement to secure all slip fitting connections. Ensure that system is in the location where it will be in operation. **Confirm water flow direction arrows on all valves and filters before assembly.** **Dry fit assemblies before applying pvc primer and cement to ensure desired result.**

- **WF2190 Adapter**
- **WF1033**
- **WF1570 Elbow (x2)**
  - Use short sections of 1" pvc tubing to connect elbows.
- **WF2193 Check Valve**
- **WF3375 Adapter**
- **Pressure Gauge**
- **WF1540 Elbow**
- **WF2193 Adapter**
- **WF1390 Tee**
- **LJ2502 Bushing**
- **WF1540 Elbow**
- **WF1033 Adapter**
- **WF2193 Adapter**

**ATTENTION:** Connect the water pump to the timer. If needed, contact your sales representative to purchase the required timer.

Use short sections of 1" pvc tubing to connect elbows.
OPERATIONAL AND MAINTENANCE INFORMATION

General Operating Instructions

After assembly, check the system before operation. Complete these steps:

1. Verify that all electrical cord ends and the air pump are outside the reservoir before adding solution.
2. Verify that the WF3316 ball valve at the end of the main supply manifold above the vertical grow tube is closed.
3. Verify that both 113696 single union ball valves are open at the pump before running the pump.
4. Fill the reservoir to cover the nutrient pump intake.
5. Plug the air pump into a GFCI (Ground Fault Circuit Interrupter) outlet. Look for bubbles in the reservoir to verify that the air is pumping to each air stone. **Remember to always mount the air pump on a surface that is above the water level.** Vibrations of the pump can cause it to move. Make sure the pump does not fall into the reservoir or other liquids.
6. Consult the nutrient pump documentation and prime the pump. After pump is primed, allow it to run until water flows through the mist column inside the grow tube. **If water does not flow, turn off the pump and repeat the steps to prime the pump.**
7. Check all plumbing connections for leaks.
8. Check all pvc fittings for leaks.
9. Adjust system pressure: The normal operating pressure for this aeroponic system is 10 psi. Adjust the pressure reducing valve (112689) as needed.
10. Once air is out of all lines and water sprays from the mist column, turn off the nutrient pump.
11. If this has not been done yet, install timer and connect water pump to it. Set timer to the recommended watering cycles noted on Page 5.

**ATTENTION:** Once the system is running, monitor plant growth and adjust watering cycles as needed to maximize results.

12. System is ready to use. Add plants and grow. Mix the nutrient solution according to plant needs and instructions included with nutrient.

General Cleaning and Maintenance Instructions

For optimal performance and to increase yields, check and clean the reservoir periodically. Time between maintenance and cleaning depends on the growing environment and specific use of the system. Apply the following steps as needed to ensure that your system is working properly.

1. Disconnect main power supply to turn off all pumps. Remove reservoir cover and inspect the inside of the reservoir. Reservoir should be cleaned each time nutrient solution is replenished. Keep porthole cover in place during operation to prevent light from entering reservoir.
2. Check all plumbing connections to ensure that none are leaking.
3. Check all tube supports to ensure all are functioning as designed.
4. Inspect eyebolts to insure they are secured tightly to each vertical growing tube.
5. With the pump off, disassemble filter and clean screen and housing. Reassemble for use. See procedure on next pages for details.

**WARNING:** KEEP ALL ELECTRICAL CORDS AND CONNECTIONS OUT OF THE RESERVOIR. CONSULT THE SERVICES OF A QUALIFIED ELECTRICIAN TO ADEQUATELY AND SAFELY CONNECT THE PUMPS TO A POWER SUPPLY.

ALL ELECTRICAL CIRCUITS SHALL BE DESIGNED IN ACCORDANCE WITH LOCAL AND REGIONAL BUILDING CODES AND STANDARDS.

**ATTENTION:** During operation, always position the air pump above the reservoir/nutrient level to prevent siphoning of the reservoir. For best results, air pump must run continuously when system is in operation. **Do not connect air pump to a circuit controlled by a timer.**
Reservoir Cleaning and Maintenance

Clean the reservoir periodically to maximize plant growth and to minimize system contamination. The steps that follow can be used to pump the reservoir for cleaning and typical maintenance. Cleaning the filter is strongly recommended after cleaning the reservoir.

1. Connect a garden hose to the 112066 shutoff valve on filter. Place end of hose in a bucket or run it to the desired location.

2. Open the shutoff valve to pump out reservoir. Turn off the pump once the reservoir is empty. To prevent damage, do not run pump dry.

3. Clean the reservoir as needed and repeat the steps to pump it out again. Prime pump if needed. Consult documentation included with pump. Close the shutoff valve.

4. Remove the hose and clean the filter. See next page for filter cleaning procedure.

5. Refill the reservoir with nutrient solution.

6. Turn on pump.
OPERATIONAL AND MAINTENANCE INFORMATION

Clean the Filter Screen and Housing
Clean filters ensure proper flow. Filters should also be cleaned after cleaning reservoir to remove sediment. When a reduced flow rate or drop in pressure is noticed, follow these steps to clean filters and filter housings.

1. Turn off pump. Open valve on the filter to drain the supply line and filter.

2. Grip the filter housing and the main supply line and unscrew the housing. Do not apply force to the filter or the supply line fittings. Hold these steady when disassembling the filter.

3. Remove the screen from the housing. Using clean water, rinse the housing and the screen.

4. Insert the screen back into the housing, reassemble the filter, and close the valve.

5. Turn on pump. Prime if needed.

6. Check filter for leaks.

ATTENTION: SYSTEM SHOWN DIFFERS FROM ACTUAL SYSTEM. FILTER ASSEMBLY IS THE SAME. STEPS FOR CLEANING THE FILTER ARE THE SAME.
Replace Damaged or Broken Mist Emitter

In rare instances, a mist emitter may become damaged during shipping or installation. The 110829 drill & tap combo pak is included to easily repair a broken or damaged emitter. Review photos below to remove broken emitter and to install a new one.

1. Using a variable speed drill and the drill bit from the 110829 combo pack, carefully drive the threaded shaft of emitter into the tube. Hold drill steady and drill slowly. Do not damage threads or distort hole with bit.

2. Take a replacement WF4065 mist emitter and start it in the threaded hole. Skip to Step 4. If you are unable to start mist emitter in the threaded hole, continue with the next step.

3. Clean threads using tap. Secure round shaft of tap in drill chuck. Tap should spin evenly with no visible wobble. Do not bottom tap out in tube. Run it into hole just enough to clean threads and no further. Carefully back tap out of hole. Repeat Step 2 and continue.

4. Using WF4790 key punch, tighten emitter. CAUTION: Turn until slight resistance is felt. Mist emitter will break! Do not overtighten!

5. Inspect the remainder of the tube for damaged or broken mist emitters and repair as needed.
PAGE RESERVED FOR CUSTOMER NOTES AND RECORDS