PolyMax® Dutch Bucket
Recovery Drip System

Versatile PolyMax® Dutch Buckets are ideal for both small- and large-scale hydroponic growing.
READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE YOUR DUTCH BUCKET RECOVERY DRIP SYSTEM.

Designing a Dutch bucket system is easy and can be accomplished with minimal guidance. Once you have determined what you want to grow, where you will assemble the system, and how large of a system you will need, simply compile a list of parts. This guide provides a general overview of a basic Dutch bucket system. Use it to design your own system. Helpful hints and important information needed to safely assemble and properly maintain the system are also provided. The components of your system may differ from those shown in this guide.

SAFETY PRECAUTIONS

- Apply PVC cement (if used) in a well-ventilated area. Follow all instructions on the PVC container.
- 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 eye protection when drilling and cutting.

ABOUT THIS GUIDE

Many different Dutch bucket systems exist; this guide describes the assembly of one and shows a few other applications. Consult your sales representative for important details before you purchase the components to equip your Dutch bucket system.

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 assembly.
3. Gather the tools and assistants needed to assemble the product.

SUGGESTED TOOLS

The following list identifies the tools needed to assemble a basic table Dutch bucket system described within this guide. Additional tools and supports may be needed depending on the specifics of your system.

- Tape measure and gloves
- Marker to mark locations on PVC tubing
- Variable speed drill (cordless with extra batteries works best)
- Assorted drill bits and hole saw bits
- Level
- Tools to cut PVC tubing and water supply tubing

UNPACK AND IDENTIFY PARTS

The following steps will ensure that you have all the necessary parts before you begin assembly.

1. Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.
2. Verify that all parts listed on the Bill of Materials/Spec Sheets are present. If anything is missing or you have questions, contact Customer Service.

CARE AND MAINTENANCE

Proper care and maintenance of your system is important. Check the following items periodically to properly maintain your Dutch bucket recovery drip system.

- Check connections and all fasteners to verify that they remain tight.
- Verify that the pump is working properly.
- Check and clean all filters to optimize performance.
- Clean the tank (if used) periodically to prevent unwanted contamination of solution.
- Monitor temperatures (room and solution) to maximize plant growth.
- For replacement or missing parts, or to expand your system, contact your sales representative.

QUICK START GUIDE

For an overview of a basic Dutch bucket system, consult the Quick Start Guide near the back of this guide.
Important Information

PICTORIAL GUIDE
The following graphics and photos will help you identify the different parts of the bucket system. Consult the Quick Start Guide for additional details and diagrams. (All parts are sold separately.)

ATTENTION: The 110832 pump is required when using woodpecker drippers in the Dutch bucket recovery drip system. This pump is not recommended for small systems when the 111044 threaded tee fittings are used.

Contact your sales representative for additional details to equip your system.
Assembly Instructions

A flat surface and a stable frame works best to support your Dutch bucket system. Surface should be safe for use in a greenhouse environment where water is present. Examine the diagrams in the Quick Start section to plan the layout of your system. Consider the following:

- Height of the table, bench, or surface where you will assemble and use the system. Consider the height of your plants and ceiling. Also, if you plan to place the reservoir beneath the Dutch buckets as in this system, allow room to slide the reservoir out from under the table or bench for draining and maintenance. See the photo near the back of this guide for a system that is assembled on a concrete floor.

- Access to all sides of the system. Do not tuck system into a corner if you need to reach all sides of the system. Plants and the system must be accessible as plants mature and system maintenance is required.

- System maintenance and expansion. Your Dutch bucket system requires regular maintenance. In addition, you may want to expand the system to produce more. Design and assemble your system to facilitate maintenance and expansion.

- Anchoring of all supply and return lines. All supply and return lines should be anchored to your table or bench for best results. In the example shown, the surface allows for the installation of wire or plastic ties around the plumbing to secure in place.

OVERVIEW

A basic system consists of supply lines and return lines. These photos show the assembly of the return lines using customer-supplied PVC tubing, related fittings, and PVC cement.

Consult the diagrams and photos throughout this guide as needed. Follow the directions on the PVC container when assembling the return lines. Materials used for your system may differ from those shown in this guide.

ATTENTION: For this example, 1-1/2" PVC tubing was used to create the return lines.
2 Plan how you want to connect the return lines at the end where the reservoir tank will be located. Use the Dutch buckets to properly space the return lines during the assembly of the remaining tubes and fittings.
Assembly Instructions

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Once you have determined a layout, arrange the buckets and return lines as desired on the bench and mark the bucket drain fitting location of each bucket on the PVC return line. Verify that the fittings of the return lines remain in the desired positions.

Use a 1” hole saw bit to drill the holes for the Dutch bucket drain fitting.

Clean the shavings from each return line before use.
Before setting the buckets in position, take the siphon elbows (110049) and assemble as shown. Take the elbow assembly and install one inside each of the Dutch buckets.

Two (2) elbows are used for each basket.
Arrange a few of the buckets on the bench (at the drain end) by inserting the drain fitting of each into a hole in a return line. Verify that the buckets are in the desired position and that all return lines are running parallel with each other.

Continue by connecting the return lines to complete the return line plumbing. In this example, a hole was cut in the bench top to allow the return lines to drain. Measure the required length of the remaining straight PVC tubing and cut as needed.

Remove the buckets to allow for the final assembly of the return lines. Apply the PVC cement and connect the fittings. Do not set the buckets back in position until the supply lines are assembled and installed as described in the next procedures.
Supply line plumbing typically consists of tubing and fittings similar to those shown in the steps that follow. In many instances, two rows of Dutch buckets installed opposite each other can share the same main supply line. These steps show one way to install the supply line plumbing for your Dutch bucket system.

First determine how you will run the line to the main circulation pump which will be located in the reservoir. Layout the fittings and measure the required lengths of supply line. Cut the sections as needed and connect these to create the main supply lines for the system.

See additional assembly photos on the following page.
Supply line and return line plumbing can be secured in place using a variety of different fasteners. In this example, plastic ties are wrapped around the tubing and tightened.

Regardless of what fasteners are used, install these carefully to prevent pinching the tubing, which can restrict the water flow to or from the reservoir.

Install fitting to plug the free end of the main supply line.
INSTALL THE MAIN CIRCULATION PUMP

Required tools and parts:

- 110741 3/4" Poly Tubing
- WF2490 Stainless Steel Clamp
- Submersible Pump (Design or model may differ from what is shown in the photos.)
- Reservoir Tank

Depending on the pump, it may be necessary to first install a fitting in the pump to accept the supply line for the system. For some pumps, the fitting is included with the pump. For others, a fitting may need to be purchased. Consult with your sales representative for additional information.

After installing the pump fitting, connect the supply line tubing as shown in the example. Tighten the clamp and cut the supply line to the required length. The free end of the tubing will be connected to the remaining supply line plumbing created earlier in this example.

**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.
Assembly Instructions

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Finally, complete the installation of the main supply line plumbing by connecting it to the remaining supply line tubing.

The dashed line in the photo to the right shows the routing of the black supply line tubing. Secure the supply lines and return lines to the bench top if this has not been completed. This prevents unwanted shifting of the tubes.

Continue by installing the supply fittings and drip lines for each Dutch bucket.

Connect the supply line from the pump to the supply lines running on top of the bench to complete the main supply plumbing.
After the supply and return lines are assembled and secured, install the fittings for the drip lines. There are different fittings available for your system. In this example, the 111044 tee fittings are used for the system. On the next page, the Woodpecker Drippers with a 2-way manifold are shown. Consult with your sales representative to determine which is best for your application.

Determine the length of drip line tubing required for each bucket. Two (2) lines are needed for each bucket.

Cut the tubing to length and attach each to the 111044 tee fitting as shown. Repeat for all fittings needed for the system.

Using the 110743 hole punch tool, carefully punch a hole in the supply line for each fitting. For a uniform appearance, align the fitting with the drain fitting of each bucket when possible.

Finally, carefully grip the tee fitting with pliers and push the fitting into one of the punched holes. Gently pull the fitting to seat it in the hole. Repeat the process to install all remaining 111044 fittings.
An alternative to the 111044 tee fitting is the Woodpecker Dripper. These are available in different flow rates and have supply line pressure requirements. **Consult with your sales representative to determine which dripper and pump are best for your application.** Additionally, the 110402 2-Way manifold is needed to attach the drip lines to the dripper.

As described in the previous procedure, measure and cut the drip tubing. Two (2) lines are needed for each bucket.

Take a 110402 2-way manifold and attach it to a dripper fitting. Repeat for all dripper fittings.

Attach the dripper lines to the 2-way manifolds.

Punch the holes in the supply line as previously described and install the drippers. Grip the body of each dripper and gently pull up to seat the fitting in the supply line. Continue with the next procedure.
There are different ways to keep the dripper lines anchored inside each bucket. In the example shown on this page, the 110413 dripper weights are used.

After setting all buckets in place with the bucket drain fitting inserted into the return line, attach a 110413 dripper weight to each dripper line.

Next, simply drape the line over the bucket lip and into the bucket. There are two (2) lines for each bucket.

The depth of the dripper weight can be adjusted once the buckets are filled and planted. The next page shows filling the buckets.

**ATTENTION:** Before filling and planting the buckets, it is best to test the nutrient supply and return lines. Add water to the reservoir, verify that all buckets and lines are in place, and plug in and turn on the pump.

Check all drip lines to verify that water flows out of the weights and into the buckets.

Next, verify that the water flows out of the buckets and into the return line.

Finally, check the outlet of the return line to verify that water flows freely into the reservoir. Adjust the buckets and drip lines as needed to achieve the best results.

Check all fittings to ensure they are operating as designed.

Turn off the pump and continue with the suggestions on the following pages if these apply.
If you used the 110413 dripper weights, fill buckets with the desired growing medium. In this example, clay pebbles are shown. Other growing mediums are available. **Contact your growing specialist or sales representative for additional options.**

After filling the buckets with the selected growing medium, determine what nutrient solution is needed for your plants and mix this according to the instructions on the mixture. Mixture will be specific to system, the reservoir size, and the plants grown.

**ATTENTION:** Water quality affects the nutrient solution. Testing the water supply is strongly recommended before you mix the nutrient solution. In some instances and for best results, it may be necessary to treat the water supply. Consult the services of a water quality professional to determine the condition of the water and how to treat it (if necessary) before you begin.

Add your desired plants to the buckets.

Adjust the depth of the dripper weights as needed for your plants and turn on the pump.

Continue by reading the aerator installation information: Procedure 17.
Alternatives to the 110413 dripper weights are the 110407 dripper stakes. These easy-to-use stakes are perfect for even and consistent nutrient delivery.

After filling the buckets with the desired growing medium and planting your plants, attach a dripper stake to the end of each dripper line.

Set the stakes inside each bucket and turn on the circulation pump. Check each stake to ensure that water flows freely from each. Turn off the pump.

Gently push the stake into the growing medium as shown.

Continue by reading the aerator installation information: Procedure 17.
**OPTIONAL ACCESSORIES**

Depending on the plant and application, using 110010 Tomato RollerHook® Assemblies and the 110006 or 110007 clips can save time and labor.

The RollerHook® components are easily assembled by slipping the spool between the wire ends of the hanger. Position the spool so the lock is next to the lowest part of the wire spring. See the photos below.

After assembling each, consult the following page to view installation photos using the 110010 assemblies and the 110006/110007 clips.

*Additional purchase required: Contact your sales representative to purchase Tomato RollerHook® Assemblies for your Dutch bucket recovery system.*

**ATTENTION:** Photo to the right shows the spool incorrectly installed in the wire hanger.

When installed this way, the spool lock slides under the lock spring of the handle. As a result, the cord will unravel from the spool. *The installation steps below show the correct orientation.*
INSTALLING THE 110010 TOMATO ROLLERHOOK® ASSEMBLY

As plants mature, it may become necessary to provide adequate support. The 110010 Tomato RollerHook® Assembly used with the 110006 or 110007 tomato clips provide the perfect support system, saving you time and money.

Hang the assembled RollerHook® from a wire, cable, or frame member above the Dutch bucket system.

Pull cord from the spool so it reaches the desired Dutch bucket.

Take one 110006 or 110007 clip, wrap it around the stem of the plant, feed the cord into the hinged part of the clip, and snap the clip closed to lock cord in place.

Move back to the cord spool and tighten to remove slack. To prevent plant damage, do not overtighten.

As the plant grows, add additional clips as needed for support.
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 recommended. These are placed at the bottom of the reservoir when installed. Contact your sales representative for additional information and to purchase these items.

1. Choose a position for the air pump and use it to determine the length of each air tube. Cut two air tubes from the 110091 tubing (or other approved tubing). These must be long enough to run from the air pump position to the bottom of the reservoir.

   **ATTENTION:** Position the air pump at a level that is **above the reservoir at all times to prevent siphoning** of the nutrient solution from the reservoir.

2. Attach a tube to each stone.

3. Connect the free end of each tube to the air pump and lower each stone into the reservoir.

4. Place the air pump in the position chosen in Step 1.

5. Connect the air pump to power and test the operation. Verify that air is filtering through each air stone. Monitor the air pump regularly to ensure proper operation of the aerator system.

   **NOTE:** When the system is fully operational, the air pump will run continuously. **Do not connect it to any circuit controlled by a timer or shutoff switch.**

6. After testing air flow, turn off the aerator pump until the system is fully functional.

   **ATTENTION:** Always position the air pump above the reservoir/water level to prevent siphoning of the reservoir.
ATTENTION: To ensure proper return of the nutrient solution to the reservoir, raise the end of the table or bench so that it slopes toward the outlet end of the return line plumbing.

RAISE THIS END OF THE TABLE OR BENCH TO ENSURE PROPER DRAINAGE OF THE NUTRIENT SOLUTION BACK TO THE RESERVOIR. CHECK WITH A LEVEL IF AVAILABLE.
Quick Start Guide

**FRONT VIEW**

- Drip Line
- Supply Line from Pump
- Return Line
- Reservoir Tank

**SIDE VIEW**

- Return Line to Reservoir
- Nutrient Solution Feed Line
- 1/2” Tubing (typical)
- Air Pump
- Air Line
- Airstone
- Submersible Pump

**IMPORTANT:** Install air pump *above* the solution level in the tank.
TOP VIEW

- Return Line Capped
- Nutrient Solution Feed Line
  1/2” Tubing (typical)
- Drip Line
- PolyMax® Dutch Bucket
- Overflow
- Supply Line Capped
- Supply Line from Reservoir
- Return Line to Reservoir
Photo shows using the 110010 RollerHook® Assembly.