HARVESTRIGHT

HOME & PHARMA FREEZE DRYER

OWNER'S MANUAL

The Essential Guide for Every
Home Freeze Dryer Owner

CONTENTS

UNPACKING

UNPACKING YOUR FREEZE DRYER

You should have taken the box off the freeze dryer and inspected for damage at the time you received your unit, before you signed the Shipper’s Bill.

You should have received the following items:

- Harvest Right Freeze Dryer
- Vacuum Pump
- Power Cord
- Vacuum Hose
- Vacuum Pump Oil
- Shelving Unit
- Trays
- Owner’s Manual
- Insulator Door Pad
- Oil Filter
- Other materials, not listed here, may have been included

1. Remove Harvest Right Freeze Dryer, vacuum pump, vacuum hose, and power cord from packaging.

2. Inspect all items.

3. Remove the vacuum pump from its packaging and place it beside or behind the freeze dryer.

4. If there is a problem, call Harvest Right Customer Support at **1-800-865-5584.**

> ⚠ **CAUTION:** Do not lift the freeze dryer from the bottom of the door. Doing this may cause misalignment and inability to achieve proper vacuum, and voids the warranty. Always lift the freeze dryer from the base.

IMPORTANT SAFEGUARDS

SAFETY INFORMATION

Read all instructions carefully before using your Harvest Right Freeze Dryer. Following these instructions will help prevent injuries, damage to the freeze dryer, and will ensure that you have the best possible experience with your freeze dryer. Save these instructions.

When using this appliance always exercise basic safety precautions, including the following:

- Use this product only for its intended purpose as instructed in this Owner's Manual.

⚠ **WARNING** Do not use an extension cord when plugging your freeze dryer into your power source. Many extension cords cannot handle a sufficient draw of power and may melt or deform causing a fire or other damage.

- Do not use surge protectors or plug your freeze dryer into a GFI outlet. These sources are very sensitive and may cause your freeze dryer to unnecessarily trip the power breaker.

- Do not allow children to climb, stand on the freeze dryer, or hang on the door or shelves. They could damage the freeze dryer and injure themselves.

- After your freeze dryer is in operation, do not touch the cold surfaces during the freezing cycle, particularly when hands are damp or wet. Skin may adhere to these extremely cold surfaces.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of the freeze dryer.

- Keep fingers out of "pinch point areas". Clearances between the doors and closing mechanism are necessarily small. Be careful closing doors when children are in the area.

- Unplug your freeze dryer before cleaning or making repairs. We strongly advise that service be done by a qualified individual.

- Refrigerants: All refrigeration products contain refrigerants, which under federal law must be removed prior to product disposal. If you choose to dispose of an old refrigeration product, check with the company handling the disposal about what to do.

- This appliance is not intended for use by small children or infirm persons without capable, adult supervision. Children should be supervised when using the appliance.

- Do not use a wet or damp cloth when cleaning the plug at the end of the power cord. Remove any dust or foreign matter from the power plug pins. A dirty power plug can increase the risk of fire.

- Do not block vent air holes. If the air holes are blocked, the freeze dryer could overheat. Keep vents clean.

- Never unplug your freeze dryer by pulling on the power cord. Always grip the power plug firmly and pull straight out from the outlet. Pulling on the power cord could cause a fire and/or electric shock. A damaged power cord must be replaced by the manufacturer, a certified service agent or qualified certified service personnel.

- Use caution when putting your hands under the appliance. Any sharp edges may cause personal injury.

- Do not insert the power plug with wet hands. It may cause electric shock. In general, power consumption will average 8-10 amps of power and spike near 16 amps. Usage of a dedicated 20 amp circuit will help prevent power outages and allow for proper freeze drying (Power consumption will vary between models).

- Do not defrost your freeze dryer with a blow dryer or other heating device. There is a thermal cutoff that protects the machine and the material inside the chamber from overheating. If the thermal cutoff gets too hot, it will eliminate all power to your shelf heaters until the appropriate parts have been replaced.

NEVER OPERATE THE FREEZE DRYER IF IT APPEARS DAMAGED

If it is dropped or damaged in any way, call Harvest Right Customer Support immediately at 1.800.865.5584 for examination, repair, electrical or mechanical adjustment, or possible replacement of parts.

BE CAREFUL ABOUT WHAT YOU PUT IN YOUR FREEZE DRYER

The freeze dryer is designed to freeze dry materials or products that contain water. Freeze drying other materials may void the warranty and could damage the freeze dryer.

VACUUM PUMP RUNS HOT

Use caution when running your freeze dryer as the vacuum pump that sits external can reach 160˚F during operation. Keep your vacuum pump out of the reach of children as it may cause injury if touched. Your vacuum pump is built to run hot. Use care and caution in order to prevent injury.

RECOMMENDED OPERATING TEMPERATURES

Your Harvest Right Freeze Dryer is designed to work in a wide variety of environmental temperatures, but extreme heat and cold will affect performance. The recommended temperature range for operation is 35-90°F. The most efficient temperature range is between 45-75°F. Although safe, operating your freeze dryer

in temperatures above 90˚F will increase batch times and have an adverse effect on the condensing unit (freezer). As the temperature rises where your freeze dryer operates, so does the length of time it takes to finish. This happens because with hotter operating temperatures it is harder to reach the extreme cold required for freeze drying.

For example: a batch that normally takes 24 hours to finish in a 75°F environment could take over 40 hours to complete in hot temperatures.

QUICK START GUIDE

For a video tutorial, go to: **tiny.cc/FDSetup** (How to Setup Your Freeze Dryer).

1. Once unpacked, place the freeze dryer on a flat, clean, dry, elevated surface. Ensure that the freeze dryer side vents are unobstructed to allow proper air flow during use.
2. Check rubber door gasket to make sure it is clean.
3. Make sure inside of acrylic door is clean. Use only dry cotton cloth and warm water, no cleaners.
4. Follow the instructions for the oil vacuum pump; add the right amount of oil (Figure 3, page 8). *Instructions for the oil-free pump are on page 16.*
5. Connect the large hose to the vacuum pump and to the freeze dryer, and tighten snugly. (See Figure 1). You may use pliers, vice grips, or channel locks, as required. Do not add any additional Teflon tape, or any type of adhesive, when installing the vacuum hose. Doing this may create a vacuum leak.
6. Plug the vacuum pump power cord into the receptacle on the back of the freeze dryer.
7. Make sure the power switch on the vacuum pump is in the “ON” position. (Located on the back of the vacuum pump. “O” is off, “I” is on.)

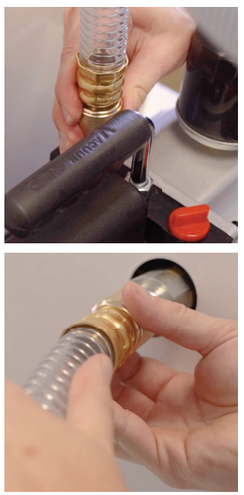


FIGURE 1

8. Place insulator door pad through the rubber gasket to plug the gap between the shelving unit and the back edge of the gasket. Make sure your shelving unit is pulled forward close to the rubber door gasket so the insulator door pad will snugly fit between the door and the shelf.
9. Secure the door latch to create a good seal. The door latch is a two-staged handle. Stage 1 latches the door and stage 2 compresses the door to the rubber gasket. Turn the handle as far to the right as possible.
10. Make sure to close the drain valve on the freeze dryer, located on the side, toward the bottom-back of your freeze dryer. The handle should be perpendicular the the hose when in the closed position. (See Figure 2, Page 7). If the drain valve is not closed, there will be a vacuum leak which could damage your vacuum pump and void the vacuum pump warranty.
11. As described in steps 4-10, it is your responsibility to make sure the door is closed properly, the drain valve is closed, and the hose connecting the vacuum pump to the freeze dryer is connected. The successful functioning of the vacuum pump depends on these steps being performed properly.
12. Turn on freeze dryer (On/Off switch is located on the back of your freeze dryer). Press the switch to the “ON” position (“0” is off, “I” is on). Next, in order to perform a quick test and assure that your freeze dryer is set up properly, please complete the following steps. To accomplish this task, your freeze dryer chamber must be free of any damp or wet material such as water or condensation. It needs to be completely dry.

    Press “Start” on the touchscreen. You will then see a screen that states “Non Liquid” and “Liquid.” Press “Non Liquid”. You will see a screen with “Pre-Frozen” and “Not Frozen”. Press “Not Frozen”. The next screen will prompt you to **close the drain valve.** Do this and press “Continue”.

    You will need to press the leaf in the top left corner to turn the vacuum pump on. When the vacuum pump first turns on, the display will read“>2500 mTorr”. Within 10 to 15 minutes the pressure will reduce until it is below 500 mTorr. When this occurs, your test is successful. Turn off your freeze dryer and open the drain valve. This will release the pressure and allow the door to be opened. You are ready to start your first batch.

    If 500 mTorr or lower is not reached, check for air leaks and repeat the test.

    1. Door must be properly closed.
    2. Hose connecting the vacuum pump to the freeze dryer should be securely tightened on both ends.
    3. Drain valve must be closed.

    Once you are able to see a pressure of 500 mTorr or lower, you are ready to start your first batch. Turn off your freeze dryer and open the drain valve. This will release the pressure and allow the door to be opened.

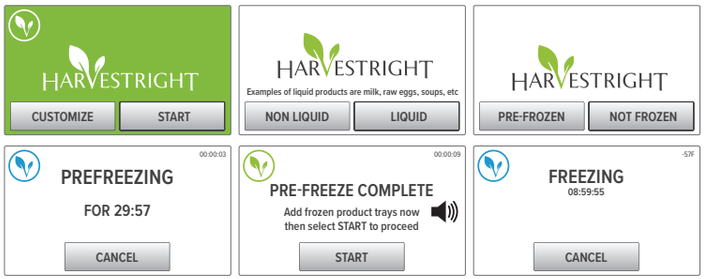
For a tutorial, go to: **http://bit.ly/DryChamber** (Dry Chamber Test Tutorial).

If you are unable to successfully complete this test because the vacuum pressure won’t go below 500 mTorr, please call **Customer Support: 800-865-5584.**

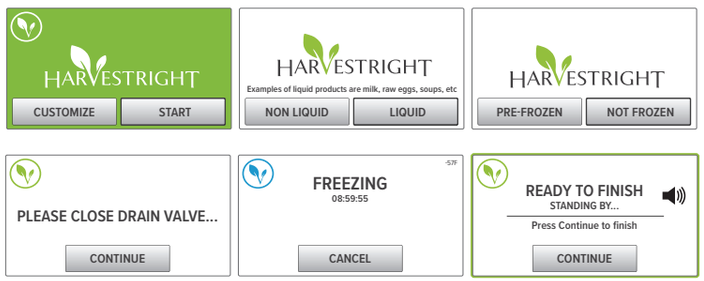
13. Prepare the material that you want to freeze dry and place it on the trays, one layer thick, so that it can be uniformly warmed by the shelving unit.

14. Place the trays in the shelving unit inside the freeze dryer; insert the insulator pad; close the door and press “Start.”

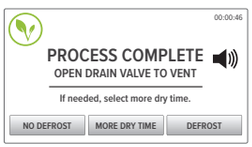
15. Material that is **pre-frozen** should be placed in a cold vacuum chamber. To accomplish this, power on your freeze dryer. After pressing “Start,” select “Non Liquid” or “Liquid” then run the “Pre-Frozen” cycle. The chamber of the freeze dryer will cool for 30 minutes. At the end of 30 minutes the screen will prompt you to put the food into the unit and **close the drain valve.** Once you press “Start”, the unit will start “Freezing.”



If your material is **not pre-frozen**, after pressing “Start,” select “Non Liquid”or “Liquid” then select “Not Frozen”. You will be prompted to **close the drain valve**. Do so and press “Continue”. The unit will start “Freezing”. Place your material in the freeze dryer and securely close the door.



From then on, everything is automatic. Just remove the material when the process beeps to notify you that it is complete. At the end of the process, follow the prompts on the screen.



For additional questions and setup instructions, refer to the detailed user guide, beginning on page 8.

GENERAL INFORMATION

MAJOR COMPONENTS

Harvest Right Freeze Dryer

Power Switch: Located on the back of the freeze dryer (“0” is off, “I” is on).

Vacuum Chamber: This circular chamber includes a shelving unit for the trays.

Trays: These hold the product to be freeze dried. Do not overload trays or batch times will be extra long.

Power and Display: The freeze dryer is powered by plugging the power cord into the back of the freeze dryer (one receptacle is for the power cord and one is for powering the vacuum pump) and a functioning 110-120 volt power outlet in the wall of your house or garage (a dedicated 20 amp circuit is recommended for Small and Medium freeze dryers and required for Large freeze dryers).

Vacuum Pump: Connect the vacuum hose to the connection on the side of the freeze dryer and to the appropriate fitting on the vacuum pump. The vacuum hose should be tight. Be sure to tighten both ends of the vacuum hose to properly connect the freeze dryer to the vacuum pump. Plug the vacuum pump power cord into the receptacle on the back panel of the freeze dryer. Make sure to add the right amount of oil to the vacuum pump as specified in the manufacturer’s instructions (See image on Page 8, Figure 3). Make sure the vacuum pump “on/off” switch is set to the “ON” position (“O” is off, “I” is on). It will not receive power until the freeze dryer completes the circuit at the appropriate time in the freeze drying process.

Oil Demister: The black cylinder attached to the top of the vacuum pump.

Drain Line: This is a clear tube, located on the side, toward the bottom-back of the freeze dryer. This tube should be un-coiled and the open end placed in a drain or a 5-gallon bucket (or similar container) to collect the water removed during freeze drying (collects as ice on the sides of the vacuum chamber). Don’t open the drain valve with the open end of the clear hose in water or the water will be sucked into the freeze dryer.

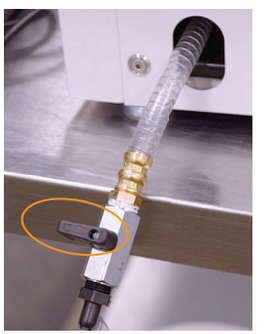


FIGURE 2

Before you start a freeze drying cycle make sure the valve on the drain tube is closed. The small handle on the valve should be perpendicular to the tube (See Figure 2).

FREEZE DRYER ASSEMBLY

Wait 24 hours before running your freeze dryer in order to facilitate proper settling of the refrigerant within the condensing unit.

1. Place the freeze dryer on a level, stable surface. The ideal location for operating your freeze dryer is a cool, dry, clean location. Dirty air will clog the cooling fins in the condensing coil and reduce the life and efficiency of the refrigeration system.

2. Make sure the inside surface of the acrylic door is clean.

FIGURE 3

FIGURE 4

3. Put oil in your vacuum pump by removing the red cap. Fill your vacuum pump to the indicated line on the sight glass and replace the cap (See Figure 3).

4. Connect the large hose to the freeze dryer (See Figure 4) and to the vacuum pump and tighten. Do not add any additional Teflon tape, or any type of adhesive, when installing the vacuum hose. Doing this usually creates a vacuum leak because it interferes with the O-ring in the hose.

5. Connect the freeze dryer power cord to the receptacle on the rear panel and to a 110 to 120 volt ac outlet (power may vary between models). A dedicated 20 amp circuit is recommended for Small and Medium freeze dryers and required for Large freeze dryers.

6. Connect the power cord on the vacuum pump to the receptacle on the rear panel of the freeze dryer.

7. Make sure the power switch on the vacuum pump is in the “ON” position. (“O” is off, “I” is on). The power button is located on the rear of the vacuum pump.

8. Make sure all other caps on the vacuum pump are closed tightly (hand tightened only).

9. Pull out your drain hose. Make sure it is in the ‘OFF’ position (the small handle on the valve should be perpendicular to the direction of the drain tube). Place the open end in a 5-gallon bucket, drain, or similar container, to collect the water that is removed during freeze drying. It is best to keep the hose out of the water.

10. Ensure that the acrylic door makes contact with the rubber gasket by examining the door in the fully closed position. You will see a thin line in the middle of the gasket as it presses up against the door. For the first couple batches, when the pump turns on, make sure the door fully seals around the gasket. The door has a two-staged handle. Stage 1 latches the door and Stage 2 compresses the door against the rubber gasket. Make sure it is turned all the way to the right.

11. Turn on freeze dryer (On/Off switch is located on the back of your freeze dryer. Press the switch to the “ON” position (“0” is off, “I” is on). Next, in order to perform a quick test and assure that your freeze dryer is set up properly, please complete the following steps. To accomplish this task, your freeze dryer chamber must be free of any damp or wet material such as water or condensation. It needs to be completely dry. Press “Start” on the touchscreen.

On the next screen, press “Non Liquid” followed by “Not Frozen”. The next screen will prompt you to **close the drain valve.** Do this and press “Continue”. You will need to press the leaf in the top left corner to turn the vacuum pump on. When the vacuum pump first turns on, the display will read“>2500 mTorr”. Within 10 to 15 minutes the pressure will reduce until it is below 500 mTorr. When this occurs, your test is successful. Turn off your freeze dryer and open the drain valve. This will release the pressure and allow the door to be opened. You are ready to start your first batch.

If 500 mTorr or lower is not reached, check for air leaks and repeat the test.

1. Door must be properly closed.
2. Hose connecting the vacuum pump to the freeze dryer should be securely tightened on both ends.
3. Drain valve must be closed.

Once you are able to see a pressure of 500 mTorr or lower, you are ready to start your first batch. Turn off your freeze dryer and open the drain valve. This will release the pressure and allow the door to be opened.

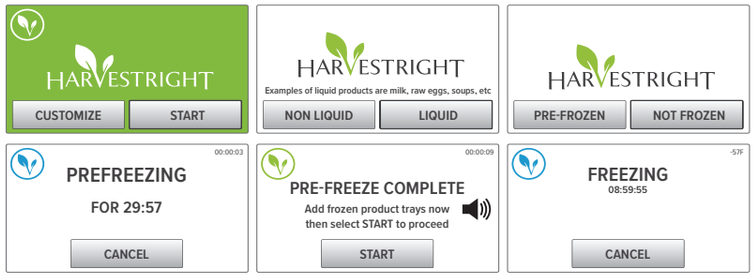
For a tutorial, go to: **http://bit.ly/DryChamber** (Dry Chamber Test Tutorial).

If you are unable to successfully complete this test because the vacuum pressure won’t go below 500 mTorr, please call **Customer Support: 800-865-5584.**

12. You are now ready to load freeze drying material onto trays.

13. Prepare the material that you want to freeze dry and place it on the trays, one layer thick, so that it can be uniformly warmed by the shelving unit. Product that is prepared in uniform thickness will dry quicker.

14. Material that is **pre-frozen** should be placed in the freeze dryer after it is cooled. To accomplish this, power on your freeze dryer. After pressing "Start," select "Non Liquid" or "Liquid" then run the "Pre-Frozen" cycle. The chamber of the freeze dryer will cool for 30 minutes. At the end of 30 minutes the screen will prompt you to put the food into the unit and **close the drain valve.** Once you press "Start", the unit will start "Freezing".



If your material is not **pre-frozen**, after pressing "Start," select "Non Liquid" or "Liquid" then select "Not Frozen". You will be prompted to **close the drain valve**. Do so and press "Continue". The unit will start "Freezing". Place your material in the freeze dryer and securely close the door.

15. Place trays in the shelving unit inside the freeze dryer. Insert insulator pad. Close the acrylic door and turn the door latch clockwise as far as it will go, compressing the door against the rubber gasket. Visually check to make sure the door is sealed properly to the gasket. If the door is not latched tight, there will be a vacuum leak.

16. Close the drain valve. In the closed position, the drain valve is perpendicular to the hose (See Figure 2, Page 7). Press "Start".

From then on, everything is automatic. Just remove the trays when the process beeps to notify you that it is complete. At the end of the process, follow the prompts on the screen.

17. When the process is complete press "Continue" on the "Ready to Finish" screen (Pharmaceutical only). You will then be prompted to "Open drain valve to vent". Before doing so, pull the drain hose out of the bucket and/or check to ensure bucket is completely empty of any water. Opening the drain valve vents the vacuum pressure. Then the door may be opened, the insulator door pad removed, and the trays removed. If product is dry, remove, and select "Defrost". Check the material thoroughly to make sure it is dry. If you find that there is still moisture in the material, simply press "More Dry Time" and allow the freeze dryer to finish drying. Otherwise, you can remove the trays, ensure drain hose is properly placed for draining, and press "Defrost".

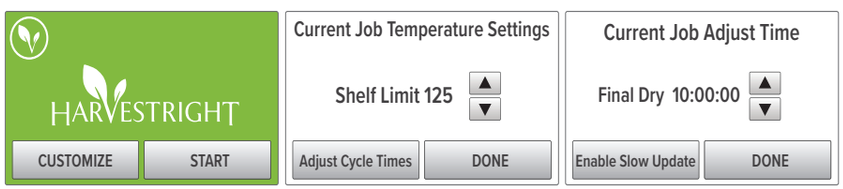
Pharmaceutical Unit Only

18. Immediately package your freeze dried material so that it doesn't rehydrate from the natural humidity in the air. When packaging food, you can use cans, Mylar bags, and glass jars. Always use an appropriate oxygen absorber.

19. Make sure all of the ice and water are removed from the vacuum chamber before starting a new batch. Pressing the "Defrost" button turns on the heaters in the shelving unit and accelerates melting the ice. Ambient air can also melt the ice over time.

USING THE "CUSTOMIZE" SETTINGS

Power on your freeze dryer. Press "Customize" on the touch screen. This screen allows adjustment of the temperature for the warming elements inside your freeze dryer. The default setting is 125°F for the Home freeze dryers and 55°F for the Pharmaceutical, but may be adjusted. On this screen you will notice a button that allows you to "Adjust Cycle Times".



This screen allows you to adjust the "Final Dry" time. To temporarily adjust this time, press the arrows up to increase the time (factory setting of 10 hours is sufficient for most items). You will see the displayed time change in 15-minute increments. Press "Done" to begin your custom batch. You will then be reminded to "Please close drain valve". Pressing "Continue" starts "Freezing" cycle. The word "Freezing..." will be displayed on the touch screen.

A CLOSED SYSTEM

In order to freeze dry items, your machine will use a vacuum pump that removes the air and creates a vacuum environment. In order to achieve adequate vacuum pressure, it is VERY IMPORTANT to ensure that all valves are closed tightly. If there is a leak somewhere in the system, the freeze drying process will not occur.

⚠ **WARNING:** You may think there is not an air leak in your machine because the door will not open (a sign that you are pulling a vacuum). However, it is possible to achieve less than suitable vacuum pressure, yet have enough vacuum to hold the door closed. Initially, >2500 is displayed. Within 10-20 minutes you should see the number 2500 begin to decrease. Drying occurs when the vacuum pressure descends to 500 mTorr (also displayed). If after 30 minutes 500 mTorr has not been reached, checking for leaks is a logical next step. Make sure the drain valve is closed and the door gasket is sealing properly (clean the gasket in warm water, let dry, and reinstall—do not wipe dry because lint may prevent a good seal).

While every precaution has been made to ensure that there are no leak points in your vacuum system, a situation could arise where there is a leak point. It is important to check the following possible leak spots in order to achieve optimal freeze drying.

POSSIBLE LEAK POINTS ON THE VACUUM PUMP

- Vacuum pump hose connections
- Vacuum pump oil is contaminated
- Vacuum pump oil level is too low
- Gaskets in the vacuum hose are damaged

For additional information about your vacuum pump, review the instruction manual that came with your vacuum pump.

POSSIBLE LEAK POINTS ON THE FREEZE DRYER

- Drain valve is open
- Vacuum pump hose not connected properly or tightly
- Door not properly shut (2 stages of closing, latch and compression against gasket)
- Door gasket not clean inside and out
- Door needs adjustment

CARE AND CLEANING

OIL VACUUM PUMP MAINTENANCE

We recommend you change and filter your oil after every batch in order to ensure high vacuum performance and to increase the life of your vacuum pump.

For optimum performance of your vacuum pump DO NOT reduce the freeze time or bypass the freezing cycle of your freeze dryer! For shorter freezing cycles you may pre-freeze the products until they are frozen solid before placing them in the freeze dryer but STILL DO NOT bypass the freezing cycle of your freeze dryer! Freeze drying products that have even a little non-solid moisture in them will reduce the performance and the life of the vacuum pump

DO NOT overload the trays in the freeze dryer. Too much product will produce too much evaporated moisture which may exceed the ice capacity inside the vacuum chamber and cause the vacuum pump to suck in the excess moisture. This may affect the performance and shorten the life of the vacuum pump.

Oil Change

FIGURE 5

1. Turn off vacuum pump.
2. Locate the drain valve for the oil reservoir located at the bottom, front of the pump. (See Figure 5). Make sure it extends past the edge of the table or cart.
3. Place your oil filter beneath the drain valve to collect the oil.
4. Open the valve.
5. Drain the oil from the vacuum pump into your filter.
6. Elevate the back of the pump and drain the remaining oil from the drain valve. Once all the oil is drained, close the drain valve.
7. Using new or filtered oil, refill the oil reservoir to the appropriate level. (See image on page 8, Figure 3)
8. Turn the vacuum pump switch back on.

Oil Filtration

1. At the end or beginning of each batch (preferably when the oil is still warm), place the oil filter below the oil reservoir drain valve.
2. Open the oil reservoir drain valve and allow oil to drain into your oil filter. Assure all of the oil comes out by lifting the rear of the vacuum pump slightly.

3. Wait for the oil to filter through your filtration system (this could take a couple of hours).

4. Remove the water from the oil by pouring off the oil and discarding the water. Do not pour the water back into the vacuum pump.

5. Pour the filtered (or new) oil into your vacuum pump.

6. Start your freeze dryer.

How do I know that my filtered oil is clean for use?

The best indications for cleanliness are as follows:

- Oil has clarity (color may be yellow or amber and still have clarity)
- Your vacuum pump achieves a pressure (mTorr) suitable for freeze drying

How do I know when I need to replace my oil filter?

- Oil won't drain through filter (happens over time as debris builds up)
- Oil isn't cleaning well

How do I replace my oil filter?

Replace the batting, the filter jar, or purchase a replacement filter from Harvest Right. The filter material inside the oil filter can be replaced after every 20 to 30 batches (or sooner if the filter looks really dirty).

The bottom material is a common coffee filter that may be purchased in any grocery store. The material above the coffee filter is quilt batting and can be purchased in most hobby stores and department stores (Walmart, Target, etc.). The quilt batting should be packed tightly into the filter jar.

CLEANING THE INTERIOR AND EXTERIOR OF YOUR FREEZE DRYER

Interior: Clean the vacuum chamber and shelves with a mild detergent and then wipe dry with a soft cloth. Remove shelves for a thorough cleaning. In order to remove the shelves, you will need to take off the black rubber gasket that the door seals against. Gently pull out the shelf. Then separate the cable. Once the red tab is unlocked, press the black tab down and pull the two pieces apart. When finished cleaning, ensure that the shelves and chamber are dry. Next, reconnect the power line to the shelving unit.

Exterior: The outer door, handle, and cabinet surfaces should be cleaned with warm water and a mild detergent and then wiped dry with a soft cloth.

CLEANING CAUTIONS

Do not use stiff bristled brushes or abrasive cloths/pads to clean the freeze dryer, interior or exterior, as this will dull or scratch the surface.

Do not use Benzene, Thinner, or Clorox for cleaning. They may damage the surface of the appliance and may even cause fires.

MOVING OR LONG ABSENCES

If you have a long vacation planned, empty the freeze dryer and keep it turned off. Wipe any moisture from the inside and leave the chamber door open to keep odor and mold from developing. Drain the pump and fill with fresh oil.

TROUBLESHOOTING

FREQUENTLY ASKED QUESTIONS

Why has the freeze dryer been running for over 46 hours and the process is not complete?

There are a number of factors that can contribute to longer cycle times. Some of which may be a combination of the following:

1. Some items are more challenging to freeze dry than others. Because of their cellular structure, sugar, and moisture content, oranges, pineapple, strawberries, blueberries, and other foods/meals with high amounts of sugary liquid will take longer to freeze dry. The freeze dryer is measuring the removal and moisture and knows when the process is complete.

2. There is so much water in the material being dried that the condensed ice on walls of chamber has begun to encroach on the trays. While rare, if this occurs, the freeze dryer cannot recognize that the process is complete because it will sublimate the ice that is coming onto the trays. If this happens, remove the trays and put them in the freezer, defrost the ice in the freeze dryer, put the trays back in the freeze dryer, and allow it to finish the process.

3. The vacuum pump oil should be changed and filtered after every batch. As the oil in your pump gets older, the cycle time for the food may increase.

4. The freeze dryer is working properly if during the drying portion of the freeze dry cycle, the vacuum is reading between 200-800 mTorr.

After my freeze dry cycle finished and I released the drain valve, water came rushing into my vacuum chamber. What happened?

Make sure to empty the container that your freeze dryer drains into. If the drain hose is sitting in water when the vacuum is released by opening the drain valve, water will suck through the drain hose and into the freeze dryer vacuum chamber like a giant straw.

We had oil spurt out of our vacuum pump, what is happening?

1. It is likely that there is a large leak in your system (or the vacuum pump is over-filled). This can happen if the drain valve is accidentally left open, the door isn't clean/aligned properly, the door seal isn't clean, or the vacuum hose is not completely tight on both ends. It can also occur if all of the caps/

fittings on the pump aren't tight. These are the most common reasons for an oil spurt.

2. The oil level gets too high because of water vapor coming through the vacuum hose and condensing as liquid into the oil (it is important to drain this water out of your vacuum pump and discard it so that you can preserve the life of your oil as well as prevent an oil spurt).

When the process is complete, sometimes the shelves are warm and sometimes they are cold. Why?

The final step of the freeze dry process is a post-dry. The shelf heaters will turn off for the last hour of the freeze drying process. This is so the trays are not hot when pulled out. When the process finishes, the heaters turn off and the vacuum pump turns off. The condensing unit (freezer) stays on to make sure the ice does not melt and rehydrate the product being freeze dried.

If the product is removed immediately after the process is completed, the trays may be hot from the heaters that are on during post dry. If you take the product out a few minutes after it beeps, the trays will be cold. If you don't get the material out within a few hours, the trays will be very cold. Always remove the trays with a glove because they will either be warm or cold.

Although the trays are at -40°F, because there is no water in the product to freeze and make it cold, the material will seem to be at room temperature on -40°F trays.

Test that the product is 100% complete by breaking the thickest piece. If it is cold or wet in the middle, there may be a bit of moisture left in it, and it should be put through the vacuum-dry cycle one more time.

I packaged my food and it was very dry when it came out, but now it is not dry. Why?

1. Properly packaging the freeze-dried material is vital. It is important to promptly package your freeze-dried product. When packaging food, you can use Mylar bags (in order to seal thoroughly, we reccomend you seal the bags twice to be safe), #10 cans, or mason jars. Always use the appropriate oxygen absorber. To ensure long shelf life, store in a cool, dry location.
2. Occasionally all of the product will be perfectly freeze dried with the exception of a couple of pieces. This can happen if you cut a few pieces of your product much thicker than the rest. If packaged, one wet piece will re-hydrate and ruin the whole batch. When a batch is complete, it is a good idea to break the thickest piece on your trays in half and test it in order to be sure that the product has completed the drying process. If you find that the material is not completely dry, simply put it back in the freeze dryer and press "More Dry Time" to get right back into the vacuum pump/drying portion of the freeze dry cycle. The freeze dryer will then finish the pieces that weren't quite complete.

PUMP ISN'T TURNING ON DURING THE DRY CYCLE:

Make sure your pump is plugged into the back of the freeze dryer and is switched to the "ON" position. The freeze dryer controls the pump turning on and off, but it cannot do so unless the pump is switched on (switch is located on the back of the pump) and plugged into the freeze dryer.

OIL-FREE PUMP

OIL-FREE VACUUM PUMP SET UP

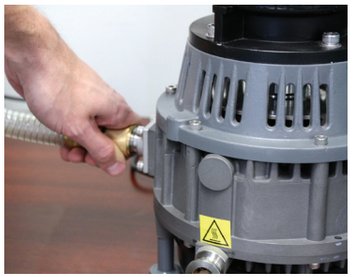


FIGURE 6

1. Connect the large hose to the vacuum pump and to the freeze dryer, and tighten (See Figure 6). Do not add any additional Teflon tape, or any type of adhesive, when installing the vacuum hose. Doing this almost always creates a vacuum leak.
2. Plug the vacuum pump power cord into the receptacle on the back of the freeze dryer.
3. Make sure the power switch on the vacuum pump is switched on.

For optimum performance of your vacuum pump DO NOT reduce the freeze time or bypass the freezing cycle of your freeze dryer! For shorter freezing cycles you may pre-freeze the products until they are frozen solid before placing them in the freeze dryer but STILL DO NOT bypass the freezing cycle of your freeze dryer! Freeze drying products that have even a little non-solid moisture in them will reduce the performance and the life of the vacuum pump.

DO NOT overload the trays in the freeze dryer. Too much product will produce too much evaporated moisture which may exceed the ice capacity inside the vacuum chamber and cause the vacuum pump to suck in the excess moisture. This may affect the performance and shorten the life of the vacuum pump.

WARRANTY INFORMATION

3-YEAR LIMITED WARRANTY

All sales of Harvest Right Freeze Dryers after February 1, 2019, are covered by this warranty.

Full One-Year Warranty (only includes the U.S. continental 48 states)
Warranty Period: For one year from original purchase date.
Exclusion: Oil vacuum pump has 6 months warranty.
Harvest Right will be responsible for: Repair or, at our option, replace any part of this freeze dryer which proves to be defective in workmanship or material.
Consumer will be responsible for: Costs of service calls and parts for consumer misuse and neglect of product. See Normal Responsibilities of the Consumer listed below.

Limited 3-Year Warranty
Warranty Period: For the second and third year from the original purchase date.
Harvest Right will be responsible for: Repair or, at our option, replace any part of the sealed refrigeration system (compressor, condenser, evaporator, tubing) which fails because of defective workmanship or material.
Consumer will be responsible for: Diagnostic charges for determining defects, and any costs for transportation and delivery of the appliance required because of service.

Limited Warranty (Alaska, Hawaii, Canada and Puerto Rico)
Time periods listed above.
Exclusion: Oil vacuum pump has 6 months warranty.
Harvest Right will be responsible for: All provisions of this limited warranty are the same as listed above except that service will be provided by the customer or a qualified local service provider that is approved by Harvest Right.
Consumer will be responsible for: Cost of transportation of the product to the shop or the travel cost of the technician to the consumer's location.

Limited International Warranty (includes all countries not described above)
Warranty Period: For one year from original purchase date.
Exclusion: Oil vacuum pump has 6 months warranty.
Harvest Right will provide: Support through telephone and e-mail only. At our option, all parts deemed necessary will be provided by Harvest Right.
Consumer will be responsible for: Costs of local service and cost of parts for consumer misuse and neglect of product. Costs for transportation and delivery of all parts, for any reason, from Harvest Right to Consumer.

Normal Responsibilities of the Consumer:
This warranty applies only to products used in clean environments. The consumer is responsible for the following items:

1. Proper use of the appliance in accordance with the instructions provided with the product.
2. Proper installation in accordance with the instructions provided with the appliance and in accordance with all local electrical codes.
3. Proper connection to a grounded power supply of sufficient voltage, replacement of blown fuses, repair of loose connections or any defects in house wiring.
4. The appliance must be operated in a clean open area that has plenty of airflow and is not above 90°F (33°C) or below 35°F (2°C).
5. Damages to the appliance during or after installation. Do not lift the unit by holding onto the door.

Exclusions:
1. Any modifications or add-on after-market accessories.
2. Consequential or incidental damages such as, but not limited to, property damage and incidental expenses resulting from any breach of this written or any implied warranty.
3. Service calls which do not involve malfunction or defects in workmanship or material.
4. Damages caused by services performed by persons other than authorized by Harvest Right
5. Parts other than Harvest Right repair parts or parts obtained from suppliers other than Harvest Right personnel
6. External causes such as abuse, misuse, inadequate power supply, or acts of God.
7. Products with original serial numbers that have been removed or altered and cannot be readily determined.
8. Using an extension cord instead of direct line connection to power supply.

Service:
Since it is the responsibility of the consumer to establish the warranty period by verifying the original purchase date, keep your delivery slip or purchase receipt or some other appropriate payment record. This written warranty gives you specific legal rights. You may have other rights that vary from state to state. Service under this warranty must be obtained by contacting Harvest Right directly:

Harvest Right
95 North Foxboro Drive, Ste. 100
North Salt Lake, UT 84054
USA
1-800-865-5584

Returns
Within 30 days of ship date, customers may return their freeze dryers for a refund less shipping costs and less a restocking fee of 15%.

1.800.700.5508 HARVESTRIGHT.COM