



Freeze Drying 101

Maintenance and Proper Use for Freeze Dryers

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Purchasing a freeze dryer can be quite a large financial investment. To protect your investment and make sure you have desirable experience with your freeze dryer, it is necessary to follow proper maintenance and use procedures.

Freeze Dryer Location and Setup

Before purchasing a freeze dryer, you need to make sure you have a suitable space to house your appliance^{1,2,3}. It needs to be large enough and sturdy enough to hold both the freeze dryer itself and the oil pump. Freeze dryers vary in weight from about 90 pounds to over 250 pounds (depending on the model). The vacuum pump will add another 30-35 pounds.

You should not place your freeze dryer on the ground. This can make your machine more susceptible to damage

as the hose and cord connections are more apt to be jostled causing the cords to become loose or destroyed. In addition, if the machine is on the floor, it makes it difficult for the water to drain after each cycle. To ensure easy access, it is recommended to place your freeze dryer at counter height either on a sturdy counter or an industrial cart that is designed for the combined weight and size of the machine and pump. Having the machine at this height also makes it easier to change the oil in the vacuum pump.

There are also other factors to consider when deciding where to place your freeze dryer. It needs to be in a place with a temperature between 32° Fahrenheit and 90° Fahrenheit. Operating your freeze dryer at temperatures exceeding 90° F will shorten the life of the refrigeration compressor, and some models may even void the warranty. If possible, place in an area with low humidity and you



¹ Blue Alpine (2024). Owner's Manual. <https://bluealpinefreedryers.com/pages/software-update>

² Prep4Life (2024). Owner's Manual V3-1. <https://p4lfood.com/pages/owners-manual>

³ Harvest Right (2024). Owner's Manual, The Essential Guide for Every Freeze Drying Owner. <https://harvestright.com/wp-content/uploads/2022/04/Owners-Manual-DIGITAL-v042022-2.pdf>

need to ensure that you have good ventilation. Do not place the appliance near sources of heat such as stovetops, ovens, or radiators.

When running a cycle, freeze dryers can be quite noisy as well as produce quite a bit of heat. For this reason, it is not recommended to have the appliance in an everyday living area or near a bedroom. However, you do need to still have it close enough so that you can hear any noises it may make to signal the end of the cycle or the alarm if there is an issue. If you live in an area with temperature or humidity extremes and have a heating/cooling system that moderates your temperature, your machine will function properly. However, it may take extra time to complete your drying cycle.

Basic Care and Maintenance

For safety and to ensure your freeze dryer runs properly, there are a few basic recommendations^{1,2,4}

- Plug your freeze dryer cord directly into the wall, never into an extension cord or power strip. Certain models require a dedicated 220 outlet, be sure that you have the proper electrical capacity for your machine.
- Make sure the freeze dryer is always sitting on a level surface before starting a cycle.
- Check the oil level before each cycle to ensure there is an adequate amount in the vacuum pump. Never run the vacuum pump without oil as that will ruin your pump.
- After each batch is complete, defrost your machine until all the accumulated ice on the walls of the chamber has melted. Before defrosting, place the drain hose in a large bowl or bucket. Once all the water has drained, use a cloth to dry any remaining moisture. Note: always remove food before defrosting your freeze dryer or the food will rehydrate.
- Outside temperature and humidity will impact your freeze drying times. The higher the temperature and humidity the longer the processing time for your product. If possible, operate your freeze dryer at times with lower humidity and when the temperature is below 90 degrees.

Cleaning Your Freeze Dryer

You must clean your freeze dryer to ensure that the machine functions properly^{1,2,3}. In addition, failure to clean the machine can result in the growth of mold in the machine.

- When cleaning the tray rack, remove the door seal, take out the rack, and disconnect the wires. The rack can be

cleaned with water and dish soap. Do not submerge the rack or place it in the dishwasher. If needed, the tray surfaces can be sanitized using a bleach solution. This solution can be made by mixing one tablespoon of bleach with 1 gallon of water.

- The inside of the chamber can be wiped down with water and the walls sanitized. This can be done as often as needed but should always be done after processing greasy or oily foods.
- The door should be cleaned using water followed by the sanitizing solution recommended above. Avoid using any solvents such as rubbing alcohol.
- At least once per year, use compressed air to clean the dust out of the condenser and clean all electronic components.

Vacuum Pump Care

There are a few distinct types of freeze-dryer vacuum pumps currently on the market, and they differ in both price and maintenance schedules. The type of pump available depends on the brand of freeze dryer you own. Depending on the type of pump, it is recommended to change and filter the oil every 3 to 6 batches, while some pumps only need to have the oil changed every 20 or so batches⁵. How much oil you will drain, and then need to replace, will depend on your pump. A few models even offer an oil-less vacuum pump. Read your owner's manual to determine how often you need to change the oil in your pump^{1,2}. Check the quality of the oil before each batch. If the oil is milky, murky, or discolored, the oil needs to be changed. Make sure to only use oil designed for high vacuum pumps. When filtering the oil, follow the manufacturer's instructions.

Proper liquid disposal

When the quality of the oil has decreased to where it can no longer be used, it needs to be disposed of properly. You can take the oil to your local household recycling site or similar disposal site. Some vehicle oil-changing businesses will also accept your used vacuum pump oil.

After the freeze dryer is fully defrosted, the liquid, which is from the defrosted ice and the moisture that was removed from the food that was processed, can be disposed of in a dedicated drain or utility sink. This liquid should not be disposed of in an area used for food preparation. Never dump this liquid outside in your yard or garden. As stated in, Article 1 of this series, *Basics of Home Freeze Drying*, "The growth of harmful bacteria is minimized by removing the moisture of the food; however, some bacteria may survive the freeze drying process." Disposing of the

⁴ Harvest Right (2024). FAQ-What Maintenance is Required for a Freeze Dryer? <https://harvestright.com/faqs/>

⁵ Harvest Right (2024). Oil Filter Maintenance. <https://harvestright.com/wp-content/uploads/2024/10/Oil-Pump-Maintenance-Schedule-042024-Web.pdf>

liquid correctly ensures that your food sources remain clean and free of contaminants that could cause you to become ill.

Appliance Issues

If your freeze dryer is not working properly, contact the manufacturer. They have trained technicians that can walk you through a variety of common problems. If your machine is still under warranty, issues with equipment may be resolved more easily. You can also contact your local Cooperative Extension office as they may know if there are any local contacts to assist with freeze dryer repair.



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