

## VACUUM ERROR SOLUTIONS (PAGE 1)

Use this as a checklist. Go through each item and check it off before moving to the next.

### When you have a vacuum error, things to check for:

- a. Closed drain valve.
- b. Check vacuum hose connections. Remove the hose from the freeze dryer and the vacuum pump. Make certain the rubber “O” rings on each end of the hose are not damaged.

- c. Vacuum Hose connections—  
securely hand tightened for JIC fittings (see picture of a JIC fitting).  
If you have the other style fitting that requires a wrench (see picture), please tighten it securely with a wrench.



OTHER FITTING  
(wrench tighten)



JIC FITTING  
(hand tighten)

- d. Vacuum pump plugged into back of freeze dryer.
- e. Vacuum pump powered on (see on/off switch on vacuum pump).
- f. Vacuum pump needs to have New Oil and the oil should be filled to line in middle of sight glass.
- g. Vacuum pump free of 3rd party accessories or modification(s).
- h. Silicone Door Gasket – clean and not damaged (inside and out).
- i. Make sure the door is clean so you get a good seal.
- j. Does door seal against the gasket – can you see a thin ring, when door is securely closed, that goes most of the way around gasket?
- k. Run a dry vacuum test:
  - i. Make certain your chamber and shelf unit are clean and dry. Water and debris/grime may cause this test to fail. Therefore, you should wipe out the interior of the chamber to ensure it is clean and free of ice and water. Again, make certain your shelf is also clean and free from water.
  - ii. Drain hose needs to be sloped down to ensure all water is out of it.
  - iii. Close drain valve.

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- iv. If you haven't already done this, remove vacuum hose and check "O" rings on both ends of the vacuum hose. Make sure they are in place and are not damaged.
- v. Replace hose. Hand tighten both connections; or, if your hose connections require a wrench, please use that to tighten them.
- vi. Look at the sight glass on your vacuum pump. What is the appearance of the oil; how high or low is it filled? It should be right in the middle.
- vii. If you are using an oil pump and the oil is dirty or cloudy, it should be replaced. Be sure and tilt the vacuum pump forward when removing the oil to get all the oil and water out of the pump.
- viii. Power on the freeze dryer; then press the leaf/logo consecutively until the freeze dryer is in the "Freeze" mode. You will hear the refrigeration condenser running. Let it freeze for 30 minutes or longer. Then press the leaf/logo until the freeze dryer is in the "Vacuum Freeze" or "Dry" mode. The vacuum pump will turn on. It should pull down lower than 500mT in 20 to 30 minutes. Keep track of how long it takes to pull down. What is the pressure reading that it pulls down to?
- ix. The next two steps are for those who have Harvest Right's standard oil pump. If the unit will not pull down to 500 mT, remove the oil demister on the vacuum pump and let it run for a few minutes. Does that help pull a lower vacuum? The demister may just be clogged.
- x. If you still can't pull a vacuum below 500 mT, try a toilet paper test. Take a narrow (1 inch wide) piece of toilet paper and hold it above the vacuum pump exhaust with the oil demister removed. Does it blow and shake extensively? Try putting your finger or palm over the exhaust. Does it blow against your hand?
  - 1. If the toilet paper shakes substantially or if you can feel the air blowing on your hand, the Freeze Dryer likely has a leak somewhere (door, door gasket, vacuum hose, drain hose, etc.)
  - 2. If there is very little air coming out of the exhaust and the pressure is still higher than 500 mT, it is probably a sign that the vacuum pump is bad and needs to be replaced.
- i. If the vacuum pressure did not reach 500 mT during the dry test, use a thumb drive to capture data from the freeze dryer's USB port, copy to computer, and then e-mail freeze dryer data (file that says "Harvest") to a Harvest Right Support Technician.

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- i. To capture this data, just turn off freeze dryer at the back of the unit. Then insert thumb drive into USB port that is on the side of the freeze dryer next to the screen. Turn the freeze dryer back on. The history of prior batches will be recorded on the drive in a file called "Harvest."
- ii. This data will help the Harvest Right technician further diagnose freeze dryer performance issues:
  1. How long was the freeze time?
  2. How cold did the food get?
  3. What vacuum pressure was reached?
  4. How high did the temperatures get during drying cycle?
  5. How long was each cycle (freezing, drying, final dry)?
  6. How long did a batch take?

\*Other things to consider:

- a. If you have an oil vacuum pump and you are getting oil into your vacuum hose, do the following:
  - While doing a dry test, once you have pulled a low vacuum (500 mT), turn off the vacuum pump and watch to see how quickly the pressure in the chamber climbs. If the pressure stays somewhat low, that means the check valve is fine. However, if the pressure falls quickly (the vacuum pressure number gets bigger) you may have a check valve that is stuck open.
  - This test doesn't work with a dry pump. Dry pumps always unwind when they are shut off and air is quickly allowed back into the chamber.
- b. Make sure the oil you put in vacuum pump is free of water. You can see it at the bottom of your oil filter container after the oil has been filtered and after it has been sitting for a day.
- c. When using an oil-based vacuum pump, do not use a wrench to remove the connection beneath the hose that goes to the check valve. This will break the connection or at the very least make it so the pump can't pull a vacuum. Hoses (for freeze dryer purchases from 2016 until now) should be hand tightened only. If you use a wrench, you are taking off the wrong connection.
- d. Is the sight glass dirty? This is a sign that the oil has not been changed often enough and/or food has not been frozen solid enough (too short of a freeze cycle) during freeze drying.