



Operating the Samdri PVT-3B Critical Point Dryer

CAUTION-GLASS UNDER PRESSURE

****Wear Safety Glasses and Do Not Look Directly into Viewing Window****

Before You Begin:

Your samples must be dehydrated through to 100% Ethanol, and in porous containers. KEEP WET IN ALCOHOL AT ALL TIMES.

Check the Fill, Cool and Purge valves are all open, the chamber lid screws are loose and the CO2 tank valve is closed.

Instructions:

1. Close the Fill, Cool and Purge valves – finger tight only!
2. Remove the chamber lid screws and set the chamber lid on the bench top. Fill the with 100% Ethanol, enough to cover your sample container(s).
3. Quickly transfer your sample container to the chamber – do not let it dry out.
4. Replace the chamber cover – right side up (look for the pin) and hand tighten the retaining screws in sequence so they are evenly tightened completely.
5. Turn power ON. Open CO2 tank fully. (look and listen for leaks – if you notice a leak anywhere in the system STOP and seek assistance).
6. Open the COOL valve 2 full turns. Temperature should drop to 0°C in about 1 minute. You should hear the gas hissing during this process – if does not drop or you don't hear the gas hissing **STOP NOW**. CO2 may be low. Seek assistance. **This is the last step you can stop at without risking damage to your samples.**
7. Close the cool valve now.
8. Slowly, open the FILL valve 2 to 3 full turns. Pressure will rise to ~800-850 psi. (*If the pressure rises above 950psi CLOSE THE TANK VALVE IMMEDIATELY –SEEK ASSISTANCE!!!*).
9. **Use the mirror** to monitor the chamber-never look into the chamber directly – you should see bubbles as the chamber fills with liquid CO2. When the bubbles disappear, the chamber is full – this should take ~2 minutes, otherwise the CO2 is low.
10. With chamber full, let it stabilize for about 30 seconds to mix the CO2 and Ethanol.
11. Slowly, open the PURGE valve 2 to 3 full turns. This flushes out the Ethanol. Watch for 'dry ice' (solid CO2) flakes coming out of the exhaust. After ~2 minutes collect some 'dry ice' flakes on a paper towel, flick them off, look for a wet spot.



12. If the towel is dry under the flake, then all of the ethanol has been purged. If it is still wet after a 2-3 minutes, close the Purge Valve, allow the until to stabilize for 30-60 seconds, and repeat step 11. When ice comes out completely dry, proceed:
13. Close the PURGE Valve
14. Allow pressure to return to ~800 – 850 psi (if it dropped during the purge cycle).
15. Check the chamber (using the mirror). There should be no bubbles. A chamber of liquid CO₂ should look empty.
16. Close the FILL valve and the CO₂ tank valve.
17. Turn the HEAT switch to ON. (You may want to record the temperature and pressure rise each minute as part of your protocol data.) Pressure will rise quickly during the warm up phase – *do not leave the CPD during this time!*
18. Monitor the pressure – do not let it rise above 1500 psi – if it does approach 1500 psi, regulate the pressure by opening the PURGE valve a tiny bit, but do not let out more than 100 psi at once or it may damage the sample. Keep the chamber pressure below 1500 psi at all times. (The CPD has a safety relief disk that will rupture at 2000 psi – not a pretty sight!)
19. If the temperature rises above 37 - 38°C, switch the Heat OFF. Turn it back on if temperature falls below 33°C.
20. Keep the chamber at the critical point of CO₂ (1100 psi at 31°C) for 1 minute (use stopwatch). Open the PURGE valve a tiny bit. You will see the pressure drop. We want to control the pressure drop to about 100 psi/minute when chamber pressure is above 1100 psi.
21. Below 1100 psi pressure drop can fall at 250 – 300 psi/minute. When Pressure falls below 250 psi – open the PURGE valve 3 full turns.
22. At a pressure of 0 psi switch the Heat to OFF. Unscrew the chamber lids retaining screws and open the chamber. Remove your sample containers to a dry holder. (Samples are very hydroscopic at this point). Proceed to the next step to depressurize CO₂ lines.
23. Replace chamber cover and tighten screws. CO₂ tank valve must be CLOSED. Open FILL, COOL and PURGE valves 3 full turns. You may see a transient rise in the chamber pressure – but it should drop back to 0 psi quickly. With the chamber pressure at 0 psi, loosen all three chamber lid retaining screws.
24. Turn the Power switch to OFF and check the CO₂ tank valve is closed.
25. Rinse the bucket. Log your use in the CDP log book.