

CRITICAL POINT DRYER SOP
AUTOMEGASAMDRI – 915B Series C

Revised April 2020

Purpose: The Tousimis critical point dryer is a fully automatic system used to dry fragile samples after a wet release process. By using liquid CO₂ (LCO₂) as the transitional fluid at the critical point, the process will eliminate stiction and surface tension issues. The tool is capable of processing samples from 6" wafers to small pieces.

Chemicals: Isopropyl alcohol will be used as the dehydration solvent and is extremely flammable.

Extreme cold: Some components will become extremely cold due to expansion of LCO₂. Do not touch any parts that become frosted during operation.

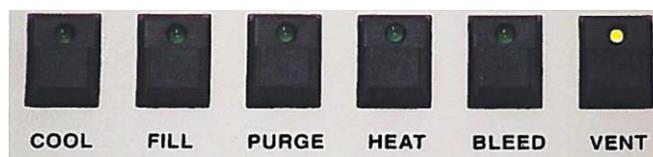
High Pressures: Under normal operation, the process chamber will hold pressures as high as **~1500 psi**. Extreme care must be taken to ensure that the top cover is properly fastened and do not open the lid if it does not read **0 psi**.

Restrictions:

- No photoresist, tapes or adhesives can be used in this tool.
- Do not expose the chamber to ANY acids or damage will occur. Rinse parts extremely well as outlined in this SOP.

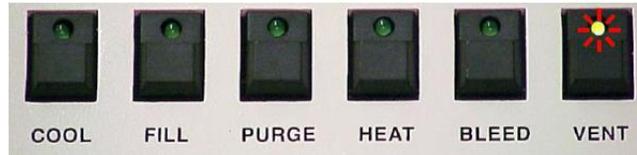
Critical Point Dryer Operation Procedure:

1. Log into **FOM** to operate the system.
2. Before starting, look at the LCO₂ scale on the wall by the CPD and make sure there is enough LCO₂ for you run. Above the scale is a sheet showing the weight for a bottle change. If the scale is within 4-5lbs of this minimum, then you can continue.
3. Open the **LCO₂** bottle in the chase area behind the system.
4. Switch the **Power Breaker** located on the right hand side of 915B into the **ON** position
5. Turn on the **CHILLER**. This must be turned on **30 minutes prior** to using for it is necessary to chill the coolant fluid to prior to operating the system.
6. Turn **Condenser Power ON**.
7. Turn **Chamber Power ON**. The **VENT** light will come on indicating that the unit is in the **VENT** mode.



8. The pressure gauge should be in the **"0 psi"** range. Remove the nuts from the chamber lid and remove the lid. Place the lid on lint free cloth (always protect chamber face).

9. Press the **VENT** button once. The VENT LED will blink, indicating the 915B is in **STANDBY** mode.



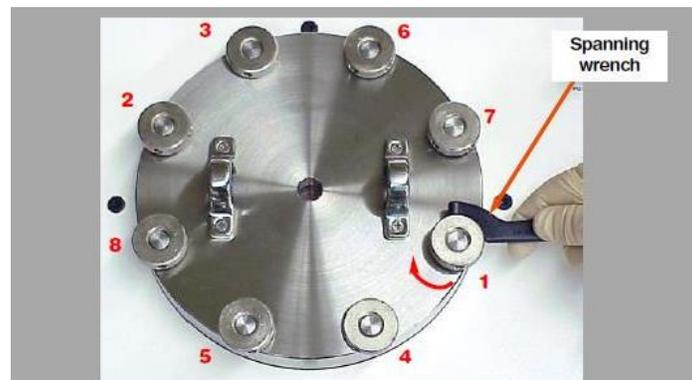
10. Use the proper chamber inserts to fit the wafer or die holder in order to reduce the volume of IPA and LCO₂ needed. You can now fill the chamber with enough IPA to cover your wafer/die. Do not completely fill chamber!



11. Carefully and quickly transfer your wafer/device from the IPA bucket into the process chamber. For best results, minimize exposure time to air.

NOTE: Do Not Introduce Any Acids into Chamber! Isopropyl Alcohol (IPA) only!

12. Carefully lower the chamber lid onto the chamber. Finger-tighten all 8 nuts then tighten using the “**Star Pattern**” shown below and on the CPD top. Repeat this rotation sequence until you are unable to tighten further.



13. Once the chamber lid is secured, it is time to set the Purge timer located to the right of the push button switches to **5 minutes and not any higher**.
14. After the **Chiller Power** has been **ON** for a minimum of 30 minutes, a process run may begin. Press the **COOL** button. The COOL LED light will go **ON**, and the VENT LED will turn **OFF**. The chamber temperature will slowly begin to drop. The cooling sequence will take about

3 minutes and will cool the chamber to 10°C. Once the chamber reaches 10°C you may proceed to the next step.

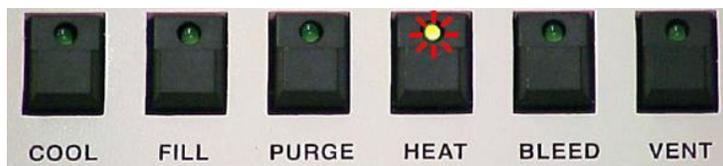
15. Press the **FILL** button and the unit will automatically begin to fill with LCO₂. The fill step will take approximately 8 minutes. From this point forward, the tool will automatically advance through all of the process modes until complete.

Purge Mode – The time for this mode is set by the purge timer knob and should remain at 15 minutes. During this step, the alcohol will be displaced from the chamber and exchanged with LCO₂.

Post Purge-Fill Mode – This will fill the chamber with LCO₂ for an additional 4 minutes. During this mode, BOTH the **FILL** and **PURGE** LEDs will be lit.

Heat Mode – This is the step where the process is carried through the “critical point”. Both the temperature and pressure will increase to the critical point parameters of 1072 psi and 31°C. The pressure will continue to increase to 1300-1500 psi.

Equilibrium – After the chamber reaches the critical point it will maintain equilibrium for the next 4 minutes. The **HEAT** button will begin to blink at this stage.



Bleed Mode – During this mode, the CO₂ pressure will be slowly reduced to approximately 400 psi.

Vent Mode – The chamber is vented to atmospheric pressure (0 psi).

16. When the process is finished the pressure gauge will read **0 psi**. If so, then the chamber lid can safely be removed using the spanning wrench using the “**Star Pattern**”. Remove samples and replace lid with nuts only finger tight
17. Turn the **Chiller Power OFF**.
18. Turn the **Condenser Power OFF**.
19. Turn the **Chamber Power OFF**.
20. Close the **LCO₂** bottle in the chase area behind the system.
21. Log out from the tool in your FOM account.