

Parylene P6/P8 Coater Operating

Instructions

This machine is to be used by authorized personnel only. For training & consultation contact:

Lab Manager, **James Bohlman**, (520) 971-3405 jimbob1@arizona.edu

1. Contact a Staff Member immediately if you observe anything unusual is observed such as the controller being off, or strange and unusual noises from the vacuum pump compartment below.

DO NOT ATTEMPT TO OPERATE THE COATER if you have any doubts!

Safety Caution: System has extremely hot and cold components and surfaces.

Cleaning Caution: Do not scratch metal sealing surfaces and O-rings.

1. Turn on the main power (If the disconnect switch on the wall is off, turn this on first)
2. Watch if the Windows is booted up. Program will be automatically initiated.
3. Log in (left top corner) – **PW:** (Username:)
- UMSCHALTASTE is the SHIFT key, EINGABE is the ENTER key
4. Measure your dimer weight with electrical scales (usually, 1 g will coat 0.6 μm thick Parylene-C)
5. To vent, change to Manual mode, turn Controller on – press venting (pressure should increase to 1E+3 mbar)
6. Open the dimer chamber.

- The chamber door needs to be cleaned every time with IPA-soaked lint-free towels. Regularly with stainless steel wire brush, clean the chamber to remove unwanted coating on the chamber.
7. **Cover inside of boat with Al foil** (Do not wrap it over the outside of the boat.). Press the Al foil to have good contact with the boat so that the heat can be transferred efficiently during the evaporation.
8. Put dimer into the boat and put the boat all the way to the back of the chamber. Slide it back out 5 mm (to ensure even heating the boat should not touch the back of

the chamber or the door) and close the door (ensure the Door switch changes from red to green)

9. Inspect the IN2 trap to ensure it is clean of Parylene. The trap should be cleaned after every deposition. (Note: The cold trap will not work as intended if it is not clean, thus impacting vacuum pressure)

10. Open the sample chamber door and confirm the sample chamber is reasonably clean of Parylene. (Note: Air and moisture can potentially get trapped under or between layers of Parylene, impacting pump down). Clean the O-ring and the door with IPA-soaked lint-free towels.

11. Place sample into the chamber, ensure the sample holder is seated in the chamber floor holes, and close the door.

12. Change into automatic mode - select desired program then press start.

13. Wait until the vacuum level reaches below <0.03 mbar.

- There is a blank button next to the automatic sign – you can check the overall procedures through clicking this button.

-Check if all steps are heated up properly as set values.

16. Deposition will be automatically processed.

Two steps of temperature increment will be shown in every process.

The coating phase will be shown even though the temperature has not reached as high as set temperature in 2nd step of chamber.

17. The system recognizes the end of the deposition if the pressure is lower than the desired base pressure and when the temperature is as the same as the desired temperature of 2nd phase.

18. During the deposition, be aware of these values on the graph.

1) red – actual chamber pressure

2) yellow – actual vaporizer temperature

3) green – actual pump pressure

19. When the deposition is done, the program changes from the coating to cooling phase.

20. After the system cooling phase has been completed, the system will wait for the user to vent. Wait until 200 C or lower to vent.

20. Remove samples from the chamber.

21. Clean chamber, chamber lid, including sealing surfaces and O-ring. Clean the Parylene coatings off the cold trap and reinstall cold trap. Open dimer door, remove foil, and clean sealing surface and O-ring.

- Use Plastic Scrapers. Do Not Use metal scrapers, as metal scrapers will scratch tool surfaces and make it harder to remove future Parylene coatings.

- Spraying parts with a 1:10 Micro-90: Water solution and waiting about 20 minutes can often make Parylene scraping and removal easier (the solution doesn't dissolve Parylene, but can help loosen the bond)

22. Put chamber under vacuum manually (turn off venting, turn on pump, turn on edge valve).

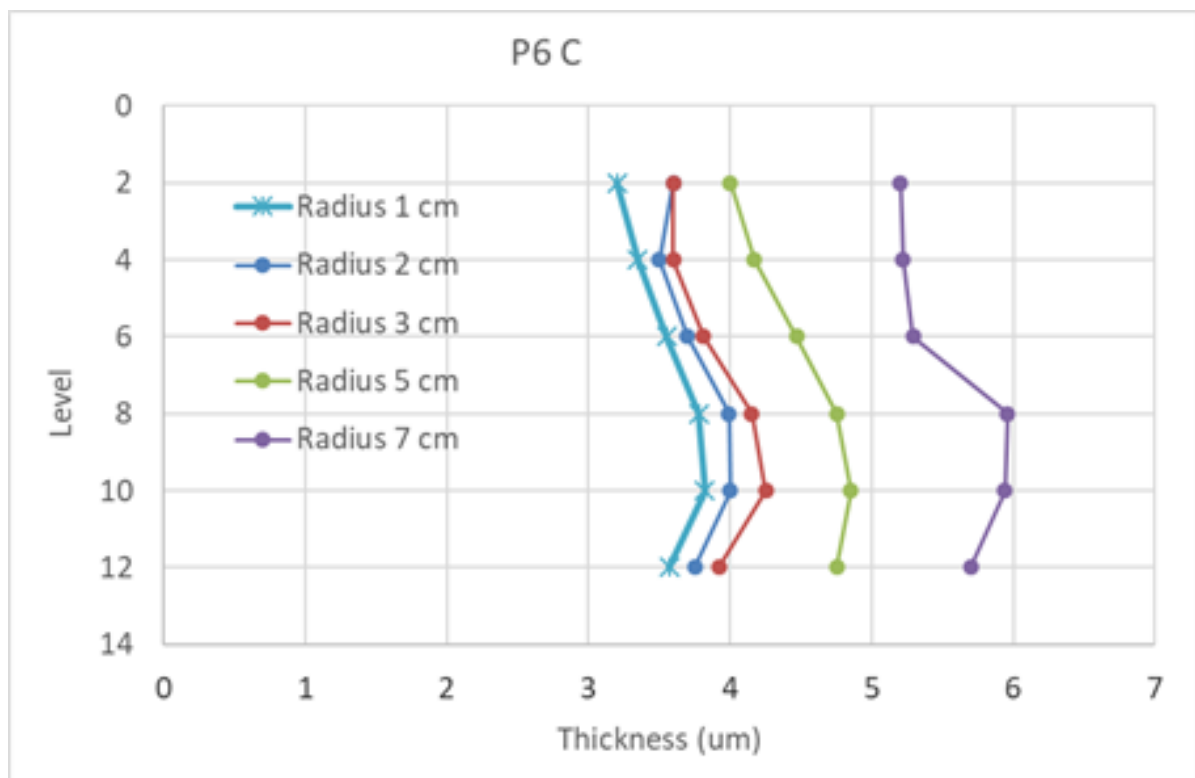
23. When the vacuum level is around 0.01 mbar, close the edge valve, turn off the pump.

24. Turn off the controller and exit the program. Shut off the main switch.

Parylene: Vendor recommends using dimer from Diener Electronics or Specialty Coating Systems. The dimer impacts the deposited film quality.

Run Time: A typical run may take about 4 hours between running the program and performing tool cleanup. Times for the Program C primary steps when starting with 5 grams of dimer are approximately: Preparation (20 minutes), Coating (50 minutes), Cooling (20 minutes), Waiting (40 minutes), Venting (set to 0, requires manual venting). Plus, tool cleaning time.

Film Thickness Variation: The graph below shows deposited film thickness for a sample carousel using 6 perforated plates. Thickness varies with radial position (from center to edge of the carousel) and vertical position (which of the 6 perforated plates the sample sits on).



Baffle Opening Orientation: The orientation recommended by the vendor is shown below. The baffle orientation influence residence time and likely deposition rate and uniformity.

