Thermal Evaporator:
Standard Operating Procedure

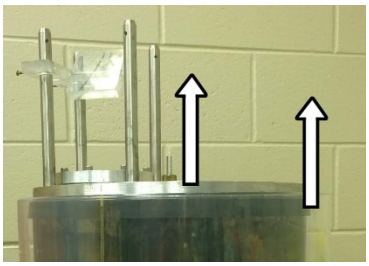
Room 421
Contact Reid Stack or Seth Calhoun with any questions

WARNING: This evaporator is used with many different materials; wear a respirator and gloves when the Chamber is open.

1. Vent the Chamber using the (air admittance) valve. Turn CCW. This will take *30-40 secs*, until hissing stops, to vent to atmospheric pressure. Close valve after atmospheric pressure is attained.

Note: The pressure on the gauge will go beyond 1,000 Torr.

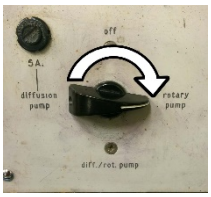
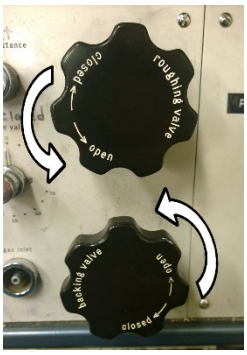
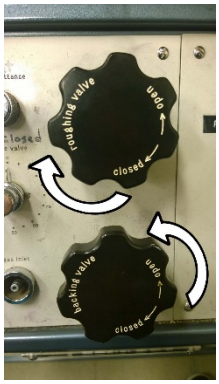
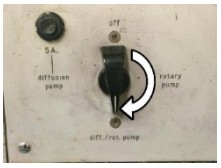
2. Remove Blast Shield and lid. Place lid top down on table to avoid contamination.

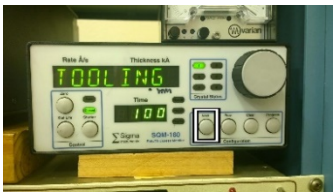
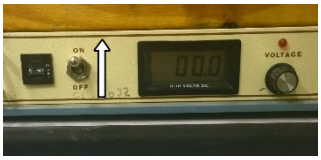


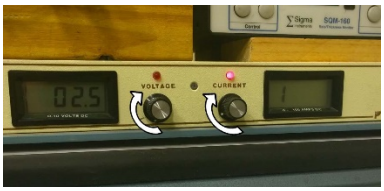
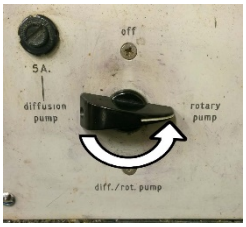
3. Remove Bell Jar by lifting approximately 1 foot from the base, and lay it on the table. Insert either rod or boat for evaporation along any other samples.

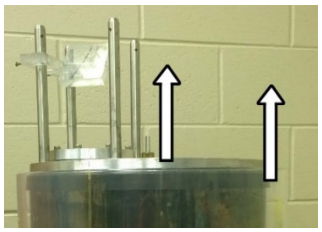
Note: Wear Nitrile Gloves as a minimum when handling chamber.

4. Replace Bell Jar with ‘Jar’ in line with the High Vacuum Valve. Note: Chamber seal needs to be cleaned and re-greased ever 3-4 runs.	
5. Replace lid and Blast Shield. Ensure that the lid is properly fitted to the seal.	
6. Turn on SQM-160 using the power switch in the back. Press Xtal Life and check the life of the sensor. If it is close to 100, then it needs to be replaced.	
7. Turn on (Water In) and (Water Out) values on wall.	

8. Turn the black knob to (rotary pump) and open the (roughing valve). Note: ensure that the (backing valve) is always open.	 
9. Wait until the chamber is pumped down to at least 80 mTorr. This will take approximately *7 mins*. Refer to the data tables to ensure it is being pumped down at the proper pace. Note: Check the seal between the lid and Bell Jar if the pumpdown rate is not in compliance.	
10. Fill cold trap with Liquid Nitrogen. Pour very slowly to avoid splashing. Note: Use approximately half a canister of Liquid Nitrogen. Wear Face-shield and Cryo-Gloves when handling.	 
11. When the pressure drops below 60 mTorr, turn knob to (diff./rot. pump), close (roughing valve) and open the (High Vacuum Valve).	  

12. Wait *2-3 hours* for pumpdown to complete. Note: Ion gauge not functioning for precise pressure measurement.	
13. Press (Program) on the SQM-160 and hit next to get to density. Adjust using knob.	
14. Hit (Next) to get to Tooling Factor. Adjust using knob. Note: Start at 100 if not known.	
15. Hit (Next) to get to the Z Factor. Adjust using knob.	
16. Hit (Program) to return to normal screen.	
17. Turn on (Line) and ensure (Current) knob is fully CCW.	
18. Turn on Power Ten Inc and GoldStar to (V). Note: Ensure that when the power supply is turned on, that the voltage on the DVM is close to ‘0’. If not, turn the unit off, turn down the voltage and current, and try again.	 

19. Slowly turn up the current knob; approximately 0.1 V/sec. Note: If the voltage light comes on, very minutely increase the voltage until the light turns off and the current light turns back on, and continue increasing the current. Note: Use GoldStar for voltage display instead of on the Power Ten Inc.	
20. When approaching final thickness, slowly turn down the current; approximately 0.1 V/sec.	
21. Turn off the Power Supply, GoldStar, and SQM-160. Turn off (Line).	 
22. Switch back to the (rotary pump), close the (High Vacuum Valve), and wait at least *45 – 60 mins* before opening the chamber.	 
23. Turn off the (rotary pump) knob.	

24. Wait *10 mins* and turn off the (Water In) and (Water Out) valves.	
25. Vent the Chamber using the (air admittance) valve.	
26. Open the Chamber as before and remove sample.	
27. Re-assemble the Chamber, and rough it down to at least 80 mTorr for storage.	
Note: When finished ensure that the lid is properly sealed, the (rotary pump) is off, the (roughing valve) is closed, the (backing valve) is open, the (Water In) and (Water Out) valves are closed, all satellite equipment are off, and the pressure in the Chamber is at least 80 mTorr.	

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