

Preliminary Check

1. Be sure main water supply is open.
2. Fully open cooling water valve counterclockwise. [Fig 1]
3. Mechanical and diffusion pump switches OFF. [Fig 2a,b]
4. Cold cathode gauge switch OFF. [Fig 2c]
5. Variac power switch OFF; heater power set to 0. [Fig 3]
6. Two vent valves CLOSED. [Fig 4a,b]
 - Note:** Valves located on left side panel and inside cabinet door.
7. Hi-Vac Valve in CLOSE position. [Fig 5a]
8. Chamber valve lever in OFF position. [Fig 5b]
9. Cabinet door is closed.

Typical Operating Procedure

1. Open vent valve on left side panel. [Fig 4a]
2. Once chamber is vented, raise hoist to separate top-plate from "bell jar" until entire assembly clears top of "bell jar".
 - Warning:** Avoid raising "bell jar" with top plate to avoid damage.
3. Swing hoist toward back of chamber to clear "bell jar".
4. Carefully remove "bell jar", placing it in a bell jar cradle.
5. Replace glass slide window in "bell jar" if necessary.
6. Close vent valve. [Fig 4a]
7. Replenish any source materials in respective boats. [Fig 6]
8. Switch boat-selector [Fig 3] to appropriate position (Left, Center or Right) and close protective cover.
9. Attach samples to platen. [Fig 7]
10. Replace quartz crystal if necessary. [Fig 7]
 - Note:** See Quartz Crystal Replacement procedure.
11. Close shutter to shield platen *and* quartz crystal. [Fig 7]
12. Return "bell jar" to baseplate.
 - Note:** Align glass slide window toward front.
13. Swing top-plate assembly directly over "bell jar".
14. Carefully lower top-plate into "bell jar"
 - Note:** Be sure top-plate seals completely atop "bell jar".
15. Switch on mechanical pump. [Fig 2a]
16. Open chamber valve to ROUGHING. [Fig 5b]
 - Note:** Pump noise should diminish within ~20-30 sec. Meanwhile, slightly rotate and push down on top-plate to help seal vacuum.
17. Switch thermocouple selector to TC2. [Fig 8]
18. When roughing pressure is $<100\mu\text{m}$, slowly rotate chamber valve lever to FORELINE position. [Fig 5b]
19. Switch thermocouple selector to TC1. [Fig 8]
20. With FORELINE $<100\mu\text{m}$, switch on diffusion pump. [Fig 2b]
21. After ~5min pour ~1L LN2 in cold trap (inside cabinet). [Fig 9]
 - Note:** Use metal funnel from Edwards evaporator.
22. After ~5min more add LN2 until cold trap overflows.
23. After ~10 min more switch on cold cathode gauge. [Fig 2c]
24. At 10^{-5} Torr, slowly turn chamber valve to ROUGHING [Fig 5b], and switch thermocouple selector to TC2. [Fig 8]
25. When pressure $<100\mu\text{m}$, rotate chamber valve to FORELINE.
 - CAUTION:** When diffusion pump is on chamber valve lever should



Fig 1

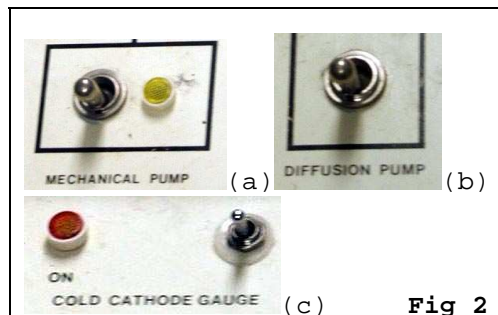


Fig 2



Fig 3

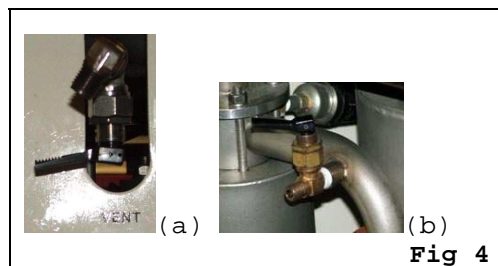


Fig 4

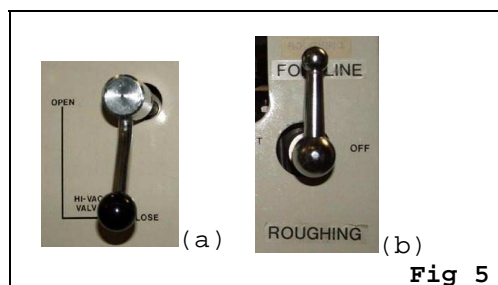


Fig 5



Fig 6

not be in *ROUGHING* position for more than 3 min! To obtain roughing pressure $<100\mu\text{m}$, turn valve to *ROUGHING* in 3 min intervals. Do not allow foreline pressure (TC1) $>50\mu\text{m}$.

26. With chamber valve in *FORELINE* position, slowly turn Hi-Vac Valve lever to *OPEN* position. [Fig 5a]

Note: Do not rotate Hi-Vac Valve lever beyond *OPEN*. Butterfly valve is closed when lever is vertical.

Note: Within $\sim 60\text{-}90$ s pressure should return to $<10^{-5}$ Torr.

27. Switch on power supply. [Fig 3]

28. Slowly turn power control dial counterclockwise to heat boat.

Note: Deposition differs for each material. Check logbook for previous depositions or develop new method.

Note: See Technical Data for Depositing Thin Films Under Vacuum table for material-specific parameters.

29. Continue to increase power slowly until boat begins to glow and evaporant begins to melt.

30. Zero thickness monitor.

31. Once evaporant has melted/sublimed, open shutter fully.

Note: See Sigma Film Thickness Monitor manual.

32. Increase power slowly until required deposition rate is obtained.

33. When required film thickness is obtained, close shutter.

34. Slowly decrease power to zero, **switch power OFF**. [Fig 3]

35. When top-plate is cool close Hi-Vac Valve tightly. [Fig 5a]

36. Follow Shutdown Procedure.

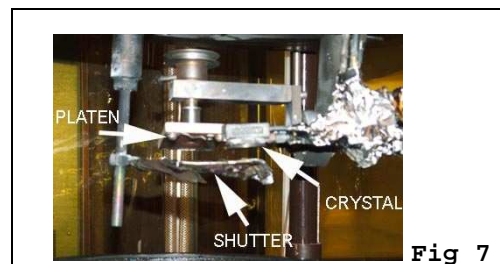


Fig 7



Fig 8



Fig 9

Shutdown Procedure

1. Switch OFF cold cathode gauge.
2. Switch OFF diffusion pump.
3. Leave pump valve lever at *Foreline*.
4. Close film thickness monitor water valve.
5. Open chamber vent valve.
6. Steps 1-8 of Typical Operating Procedure.
7. Remove sample(s).
8. Steps 10 and 12-14 of Typical Operating Procedure.
9. Slowly open pump valve to *ROUGHING*. [Fig 5b]

Note: Pump noise should diminish within $\sim 20\text{-}30$ sec. During this time slightly rotate and apply downward pressure on top-plate to seal chamber.
10. Wait 2 min after pumping noise subsides.
11. Rotate pump valve lever to *OFF* position, and switch OFF mechanical pump.
12. Check that conditions of steps 3-7 of Preliminary Check are current.

Note: Always leave vacuum systems under vacuum when not in use for extended periods of time.