

Thermionics e-Beam Evaporator User Guide

Starting Up

1. Vent the chamber by simply turning off the Mechanical Pump button. It will take about 30 minutes for the turbo pump to spin down and the pressure to reach atmosphere (7.6E2 Torr).
2. Hold down the Bell Jar button to open the chamber.
3. Take out the substrate holder to load your samples.
4. If necessary, load crucible with evaporation material. Crucible should be more than 20% full, but no more than 80%.
5. Lower the bell jar completely and start the mechanical pump. The turbo pump will start automatically.
6. The system is ready for deposition when the pressure reaches $\sim 3\text{E-6}$ torr. Although, pressure as low as $\sim 3\text{E-8}$ torr can be reached over night.

Deposition

1. Set the power supply controller's emission current to zero.
2. Press Start on the power supply controller.
3. Slowly ramp the current until you see the beam spot on the crucible (around 50 mA). Note that the major increments on the controller are 1.0 Amps (not milliamps!).
4. Turn on the x-y sweep controller. If necessary, center the beam on the crucible. See the Manual for additional information concerning optimal sweep settings.
5. Slowly increase power until desired rate is reached. 2.0 A/s or less is recommended. Stop increasing the power if arcing is observed and allow the source to soak until arcing stops. Once arcing stops, you can continue increasing the power.

Monitoring Deposition

1. Use the Inficon Deposition monitor to configure the quartz crystal monitor for the correct material.
 - a. Press PROG. Use the up/down arrows to move the cursor to the "Film" field.
 - b. Type a number (1:Au; 2: Cr; 3:Ti; 4: Pd) on the keypad and press the down arrow (E).
 - c. Press PROG to view the deposition rate and total deposited thickness.
2. Open the substrate shutter
3. Zero the thickness monitor by pressing 3 on the keypad.
4. Close the shutter when the desired thickness is reached.

Finishing Up

1. Slowly ramp down the emission current to zero.
2. Turn off the power supply controller: Press Stop.
3. Turn off the sweep controller.
4. Vent the chamber by turning off the mechanical pump. Venting takes about 30 minutes.

5. The chamber can be lifted up once the pressure reaches $7.6E2$ Torr.
6. Remove your samples, close the chamber and pump the system back down.

Changing sources

1. If you have just completed a deposition, allow the crucible to cool for 5 minutes before switching to the next source.
2. Rotate the source micrometer a full 360 degrees (CW) to select the next source in the sequence.