

### Start-Up Procedures

- ✓ Turn the cooling water ON to the compressor only (valve on the wall at the rear of the unit)  
*NOTE: Do not open cooling water to the hearth yet to prevent condensation in the chamber*
- ✓ Switch the main power shutoff (30A circuit) on the wall ON
- ✓ Ensure all valve controls are in the middle (OFF) position
- ✓ Press the vacuum control system latch (pushbutton) ON
- ✓ Turn the TC Vacuum Gauge (286) ON
- ✓ Turn the nitrogen tank ON
- ✓ Turn the mechanical pump power switch (on the grey box on the wall) ON
- ✓ Open the CRYO ROUGHING valve  
*NOTE: Ensure the cryopump pressure (TC channel 2) drops below 500 millitorr before continuing*
- ✓ Close the CRYO ROUGHING valve
- ✓ Turn the cryo compressor ON (press the power switch slowly to latch it on), wait 1 minute
- ✓ Turn the cold head ON  
*NOTE: TC channel 2 should be observed to fall in about 5 minutes*
- ✓ Turn the mechanical pump OFF (*Important: do NOT let it run more than ten minutes*)
- ✓ Open the MECH VENT momentarily until the foreline fills (flex line expands slightly)
- ✓ Wait 3+ hours for the cryopump to precool. The monitor will go from RED (warm) to GREEN (cold)

### Pump-Down Procedures

- ✓ Check the XTM/2 XTAL monitor (press XTAL, must be < 50%)
- ✓ Load required source materials in the target turrets (select each as required)
- ✓ Load substrates and close the chamber
- ✓ Turn the mechanical pump (switch on the grey box on the wall) ON
- ✓ Open the CHAMBER ROUGH valve until the chamber (TC channel 1) falls below 200 millitorr (~5 min)
- ✓ Close the CHAMBER ROUGH valve
- ✓ Open the GATE VALVE
- ✓ Turn the mechanical pump OFF
- ✓ Open the MECH VENT momentarily until the foreline fills (flex line expands slightly)
- ✓ The chamber pressure, indicated on TC channel 1, will begin fall rapidly. Wait 5 minutes then turn the ion gauge on to check the chamber pressure. Chamber pressure must be below  $5 \times 10^{-5}$  torr before proceeding.

### Evaporation Procedures

- ✓ Turn the main power shutoff for the Temescal CV-8 (50A circuit) on the wall ON
- ✓ Turn the cooling water to the source hearth ON
- ✓ Turn the rotational motor ON (low, forward)
- ✓ Turn the Yeagle Technologies MAGNET scanner ON
- ✓ Close the shutter
- ✓ Check interlocks on the CV-8 and insert the key
- ✓ Ensure the HV control is set to zero
- ✓ Turn the HV ON and increase the voltage to 8kV
- ✓ Ensure the emission control is set to zero
- ✓ Select the proper material using the turret
- ✓ Program the XTM/2 monitor for the FILM number corresponding to the turret number
- ✓ Turn the FILAMENT ON and verify the glow in the chamber
- ✓ Increase emission current until a light violet glow is seen atop the source
- ✓ Align the electron beam using the SIZE and POSITION controls to center on the target
- ✓ Increase the emission current until the source material is hot and open the shutter
- ✓ Use the emission control to regulate the deposition rate
- ✓ Close the shutter when the target thickness is reached
- ✓ Decrease the emission current to zero
- ✓ At this point another film may be deposited by rotating the turret and continuing the deposition. Align the beam again and open/close the shutter as required
- ✓ Turn the FILAMENT OFF and decrease the emission current to zero
- ✓ Turn the HV OFF and decrease the high voltage control to zero

### **Opening Procedures**

- ✓ Remove the key from the eBeam power supply control
- ✓ Close the GATE VALVE
- ✓ Open the CHAMBER VENT until a 'hiss' is heard (~4 min)
- ✓ For safety, turn off the Temescal CV-8 power supply (front panel switch on power supply)  
*NOTE: Wait five minutes for the power supply to cool before turning the power off  
(this can be done immediately after venting but before opening the chamber)*
- ✓ Turn cooling water to the hearth off to prevent condensation when chamber is opened
- ✓ Open the chamber using the lift
- ✓ **Short the high-voltage filament terminal** with the grounding safety stick

### **Shutdown Procedures**

- ✓ Close all valves (middle position = OFF)
- ✓ Turn off the COLD HEAD
- ✓ Turn off the COMPRESSOR
- ✓ Turn off the nitrogen tank
- ✓ Turn off the water cooling supply
- ✓ Turn off both main power disconnects on the wall (Main Unit and CV-8 power)