

# Evaporator Operating Procedure

## Safety Precautions

1. Ensure that the exhaust fan is always turned on throughout the experiment.
2. Always use the implosion guard when operating the Evaporator.
3. Accessories in the vacuum chamber and internal and external surfaces of the vacuum chamber can get very hot during process operation. Do not touch the chamber or accessories in the chamber until they have cooled to a safe temperature.
4. Some of the accessories used in the vacuum chamber may produce intense light. Always wear protective glasses when you look at such accessories in the vacuum chamber.
5. When cleaning the glass chamber after evaporation process, use cleaning solutions in a well ventilated area. Use a fume hood when cleaning a large surface area or when using the cleaning solution for a long period of time.

## Operating Procedures

1. Switch on the cooling-water system.
2. Switch on and start the Evaporator. Wait for at least 30 minutes for the pumping system to warm up.
3. Press the “Vent” button. When the display changes to ‘sealed’ and displays a pressure of  $1.0 \times 10^{-3}$  mbar, open the vacuum chamber.
4. Load the source (evaporation boat), source materials and substrates and then close the vacuum chamber. Ensure that the source is not bent when tightening the cap headed screws.
5. Press the “Cycle” button to start the pumping down sequence.
6. Select the appropriate layer (2 to 10) designated for the metal to be coated. Choose layer 11 for all other metals.
7. Ensure that the Density and Acoustic Impedance for the selected metal is correct by comparing with the table provided.
8. Set the Tooling Factor based on the calibrated value.
9. The evaporation process can begin when chamber pressure is  $<10^{-5}$  mbar.

10. Turn the current control knob **SLOWLY** until the evaporation source glows and the source materials warmed up and degassed.
11. Open the source shutter and use the current control knob to operate the source until the required deposition rate is achieved.
12. Close the source shutter when the desired coating thickness is achieved.
13. Turn the current control knob to zero **SLOWLY**.
14. Allow the chamber to pump for at least another 5 to 10 minutes to remove residual materials and for the source to cool down.
15. Press the “Seal” button and then “Vent” button to vent the chamber.
16. When the display changes to ‘sealed’ and displays a pressure of  $1.0 \times 10^{-3}$  mbar, open the vacuum chamber.
17. Remove the substrates and repeat starting from step 3 if necessary.

## **Shutdown Procedures**

1. Ensure that the vacuum chamber is closed.
2. Press the ‘Cycle’ button and wait until the pressure has fallen to  $3 \times 10^{-4}$  mbar or lower.
3. Press the ‘Seal’ button and wait for at least 2 minutes.
4. Press the ‘Stop’ button and wait for at least 30 minutes to allow the pumping system components to cool down.
5. Switch off the Evaporator and then the cooling-water supply.