

CEN

INDIUM EVAPORATOR

CHILLER OPERATIONS

SWITCH ON PROCEDURE

1. Check the valves if they are OPEN.
2. Switch ON the main MCB from the distribution board RYB lamps will glow.
3. Switch ON the MCB on the chiller panel.
4. Switch ON the PUMP switch on the panel.
5. Switch ON the COMPRESSOR switch on the panel.

INDIUM EVAPORATOR

1. Switch on the main **MCB** switch on the switch board. Switch on the system using the **MCB** switch.
2. Switch on the chiller. Open the inlet and the outlet valves for the water flow in the system. The chiller should be on compulsorily. See that the combination valve (**CV**) is in **CLOSE** position. Then press the **START** button of the rotary pump.
3. Note down the pressure reading the **PIRANI GAUGE** (gauge Head 2, **GH2**) in the **LOG BOOK**, if the system is being started for the first time on that day.
4. Wait until the vacuum reading in the **PIRANI GAUGE** (gauge Head 1, **GH1**) is 0.000 mbar (**OR** glows). Then turn the **CV** to backing. Then again wait till the vacuum reading in the **PIRANI GAUGE** (gauge Head 1, **GH1**) is 0.000 mbar (**OR** glows).
5. Switch **ON** the N₂ cylinder in the cylinder room. The reading of the meter should be nearly 4 kg/cm². The flow of the gas can be checked using the meter labeled N₂ present near to the system.
6. To open the **BELL JAR**, first open the **AIR ADMITTANCE VALVE** and N₂ **GAS VALVE** and keep them open till the circuit breaker breaks (usually we can hear the sound, or wait to 1-2 min) . Then turn the hoist switch to **HOIST UP** position.
7. Wait till the **BELL JAR** opens completely and then turn the hoist switch to **HOIST DOWN**. Now load the samples and also indium slug in boat.
8. . Switch on the **DTM**. Press **TEST** button to check for the purity of the crystal. It should be above 98% for proper measurement of the thickness. If the **DTM** shows **CRYSTAL FAIL**, then change the crystal. Never switch off the **DTM** till the complete process ends.
9. Close the **BELL JAR** by turning the hoist switch to **HOIST DOWN**. Check for the proper closing of the jar by checking the sides. It is very important for the jar to close properly so that there is no leakage of gas and vacuum is created inside. Then turn the **CV** to **CLOSE** and wait till the **PIRANI GAUGE** reading is **OR** in **GH1**.
10. Turn the **CV** to **ROUGHING**. Select **GH2** in **PIRANI GAUGE** and wait till the vacuum reaches 0.002 mbar or less.
NOTE: While turning the **CV** from **BACKING** to **ROUGHING** or vice-versa, move the knob slowly and when the knob reaches the **CLOSE** position, wait for a minute. This is very necessary.
11. Turn the **CV** to **BACKING**. And wait till pressure in GH1 shows 4.9E-3 then the DCU controller of turbo will get ON and press the start button and turbo will get start.

12. Wait till the vacuum in the **BELL JAR** reaches to $4E-6$ mbar or less. The reading is shown in the **PENNING GAUGE**. In the mean time,
13. See that the vacuum reaches $4E-6$ mbar or less. Switch On the **LT** controller and **CB1**.
14. Adjust the **FILAMENT CURRENT** to the desired current, by slowly rotating the knob. Note the value of the **FILAMENT CURRENT** in the **LOG BOOK**.
15. Wait till the filament is evenly heated, and then **OPEN SHUTTER** and deposition will start. The deposited thickness and rate of deposition are displayed on the **DTM** . **NOTE:** Note down the pressure in the **PENNING GAUGE**, the rate of deposition, filament current in the **LOG BOOK**. The final thickness deposited and time taken for deposition is also logged after the deposition. This record is maintained for every metal deposited.
16. After the desired thickness is achieved, close **SOURCE SHUTTER**
17. Make the **FILAMENT CURRENT** to zero very slowly. Switch of the devices in the following order.
 - a. **LT CONTROLLER OFF**
 - b. **CB1 OFF**
18. Note down the deposition rate, time for deposition from the **LOG FILE** (on the computer) into the **LOG BOOK**.
19. Wait for 10 minutes.
20. Switch OFF the **TURBO PUMP AND WAIT UNTIL IT IS VENTED**..
21. To open the **BELL JAR**, open the **AIR ADMITTANCE VALVE** and **N2 GAS VALVE** and keep them open till the circuit breaker breaks (usually we can hear the sound, or wait to 1-2 min) . Then turn the hoist switch to **HOIST UP** position.
22. Wait till the **BELL JAR** opens completely and then turn the hoist switch to **HOIST DOWN**. Now unload the samples.

SHUTTING DOWN THE SYSTEM

1. Switch to **HOIST DOWN** to lower the **BELL JAR**. Check for proper closing.
2. Turn the **CV** to **ROUGHING** and wait till the **PIRANI GAUGE** reads 0.005 mbar in **GH2**.
3. Turn the **CV** to **CLOSE** position.
4. Press the **STOP** button of the **RP**.
5. Switch of the system **MCB**, the main **MCB**, water valves (both the inlet and the outlet of the system), connection and the chiller (if no other system is using the chiller).

SWITCH OFF PROCEDURE OF CHILLER

1. Switch OFF the **COMPRESSOR** switch on the panel.
2. Switch OFF the **PUMP** switch on the panel.
3. Switch OFF the **MCB** on the chiller panel.
4. Switch OFF the main **MCB** from the distribution board **RYB** lamps will stop glowing.

IMPORTANT TIPS

1. If the penning gauge is not showing any reading after switching it ON, open the N₂ gas valve and then open the needle valve slowly so that ionization takes place inside the PNG(penning gauge) and see that the reading in PNG is 9.9E-3, then close the needle valve (not very tightly) and observe the reading.
2. If any part of the system is not working (when the doors are open), then check for the **DOOR LOCKERS**. Generally the doors close the **DOOR LOCKER**. So if the doors are open, they need to be taped properly to close the circuit.
3. Even after closing the circuit, if the system doesn't work, then check for the **FUSES** using the multi-meter. The additional fuses are available in the tool kit.
4. If the **DTM** shows '**CRYSTAL-FAIL**', then the crystal of the **DTM** needs to be checked. The problem can be either the crystal is not clean or there is some contact problem. The crystal need to be removed once. The reset of the **DTM** doesn't work. So while removing the crystal, the procedure for opening the **BELL JAR** need to be followed.
5. If the **DTM** hangs during the deposition, then the following steps need to be taken
 - a. Close the **SOURCE SHUTTER**.
 - b. Lower the **BEAM CURRENT**.
 - c. Then start the deposition process again.
6. When DTM shows DEAD open your chamber and change the crystal and see to that the crystal life is above 75% or around 98-99%.