Yale Main Campus Cleanroom

SOP title	Kurt J Lesker Thermal evaporator	Prepared by	Ida Sadeghi
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1. Purpose

This SOP outlines the proper operating procedure for the Kurt J. Lesker Company® PRO Line PVD 75 thermal evaporator to ensure user safety and optimal performance.

2. Scope

This SOP applies to all cleanroom members who operate the Kurt J. Lesker PRO Line PVD 75 thermal evaporator. The SOP does not take the place of thorough training. Please contact a staff member if you are unsure how to operate it.

3. Prerequisites

Users must have access to the cleanroom and have an FOM account.

4. Responsibilities

Yong Sun	609-917-5076
Lauren McCabe	609-902-3834
Ida Sadeghi	617-528-8986

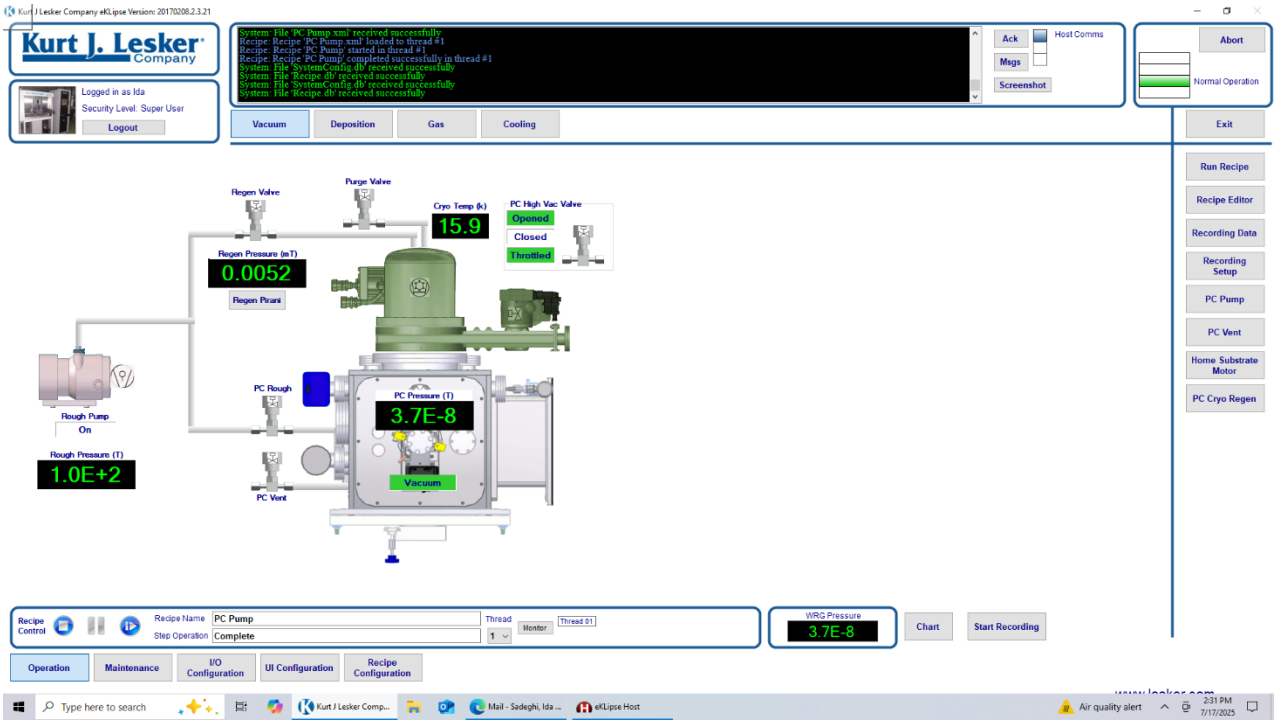
5. Precautions

Please wear a coat or coverall and long gloves to avoid Indium contamination on your skin. Indium melts easily and starts to evaporate at relatively low temperatures (its melting point is 156.6 ˚C). At typical evaporation temperatures, Indium's vapor pressure increases rapidly, leading to a burst-like release of material. This results in material redeposition all over the chamber. This is why the chamber is lined with aluminum foil. Indium droplets formed on the feedthrough can short out to the chamber, inhibiting the deposition. This can be identified by measuring the resistance between the feedthrough and the chamber. If the resistance measures a value in the MΩ range, it means it is safe to operate. If a very small resistance in the order of Ω or kΩ is measured, it means the chamber needs a cleanup.

6. Procedure

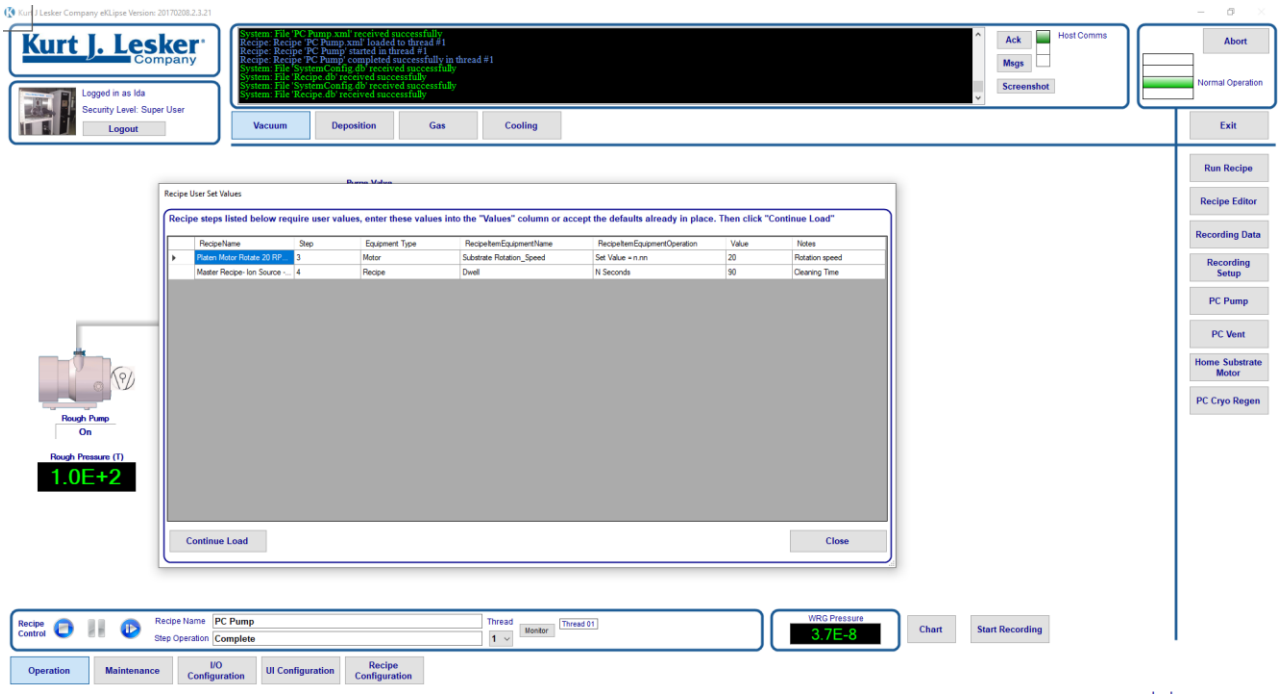
The evaporator is dedicated to indium only due to the aforementioned chamber contamination. Do not attempt to replace the material.

- Log in to FOM using your NetID and password.
- Log in to the Kurt J. Lesker software.
- Ensure the main chamber pressure is in the mid 10^{-8} Torr range and the cryopump temperature is at or below 18 K before proceeding.
- To load your sample, go to the **Vacuum** tab and click on **PC Vent** to vent the chamber.

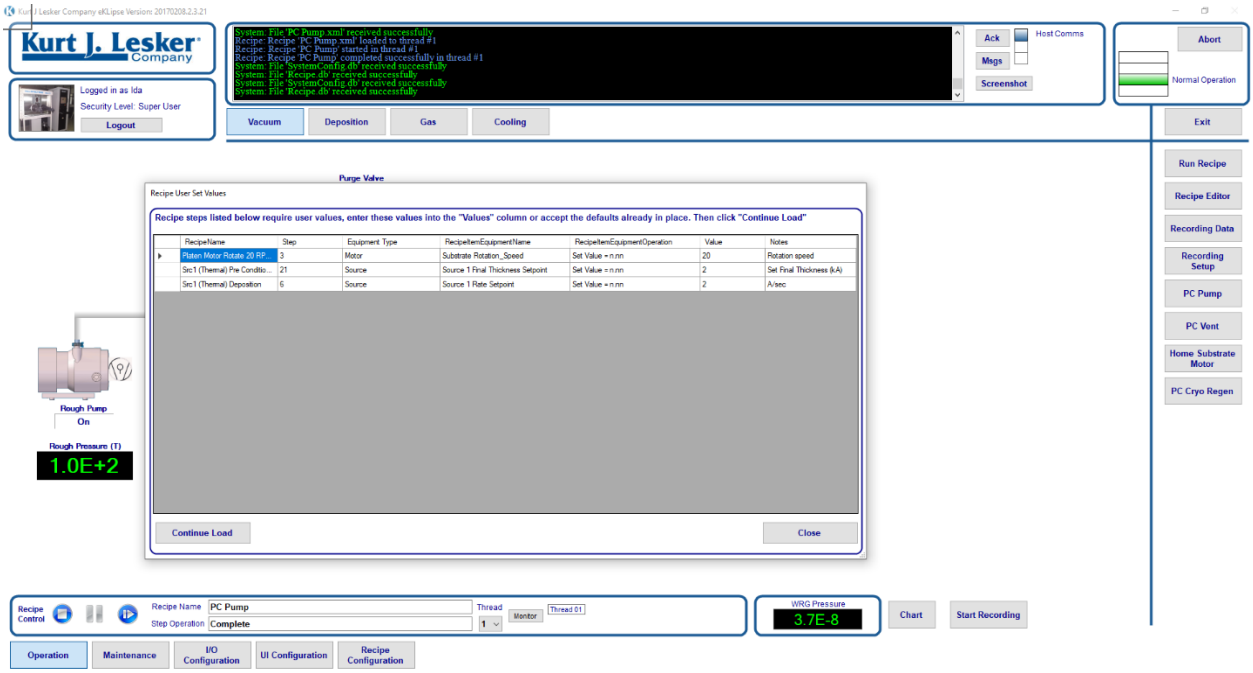


- Mount your sample onto the holder using screws.
- Click on **PC Pump** to begin pumping down the chamber. It will take a few hours for the chamber to reach E-8 Torr.
- Log out of FOM while the chamber is pumping down so you are not charged for the duration of the pump-down. Place a sign on the computer indicating that the system is in use.
- Log back into FOM once the chamber reaches the desired pressure.
- Click on **Run Recipe** to load a recipe. You can run the evaporator for either cleaning or deposition.

- If running an Ar cleaning, open the O_2 and Ar gas bottles located at the back of the electronics rack. Choose the **Master recipe – Ion Source – Users**. This recipe uses mostly argon with a minor flow of oxygen. The software will then prompt you to select the sputtering duration and substrate rotation speed. Enter those values and click **Continue Load**. The substrate rotation speed is typically set to 20 RPM. After you are done with your process, close the valves on the gas bottles.



- If running an In deposition recipe, select the **Master recipe Src 1 (Thermal) – Users**. The software will then prompt you to enter the desired growth rate, thickness, and rotation speed. The rotation speed is typically set to 20 RPM, as before. Click **Continue Load** after entering the values.



- Monitor your process to ensure it is running properly.
- Wait at least 15 minutes before unloading your sample, as it gets hot in the chamber near the source. The substrate itself is cooled while mounted on the substrate holder.
- To unload your sample, click **PC Vent**.
- After removing your sample, please place the holder back in the chamber and click **PC Pump**. Do not leave the chamber vented.
- Log out of FOM.