Kurt Lesker CMS-18 Multi Target Sputter Deposition

SOP

Prerequisites for operating the KL Deposition Tool:

a) You must already have a NRF User ID.

b) Receive “one on one” training and certification from UFNF Staff.

Safety

- **High Voltage** - High Voltage Radio Frequency and High Voltage DC is used throughout the system. System maintenance may only be perform by Kurt Lesker or UFNF Staff. Do not remove any tool covers or defeat any interlock on this system.
- **Moving Components** - The User should be aware ***at all times*** of the moving components associated with this tool. For instance, the turret unit does rotate and does present a potential hazard. The User must exert caution ***at all times*** such that a limb, finger, or article of clothing does not become trapped or entangled (or worse, violently detached) when components of the machine are in motion.
- **Heat** – The sample platen is heated and should never be touched.
- **Buddy System** – the Buddy System is not needed for after hours usage of this equipment

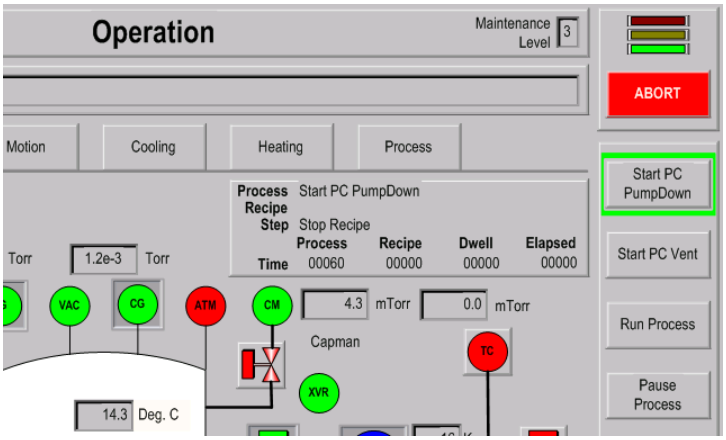
1.0 Pre-Operation

1.1 Change gloves. WARNING No solvents are allowed near the machine, change your gloves before operation!!

1.2 Log your start time in the KL Logbook spreadsheet on the stand alone computer near the gowning entry.

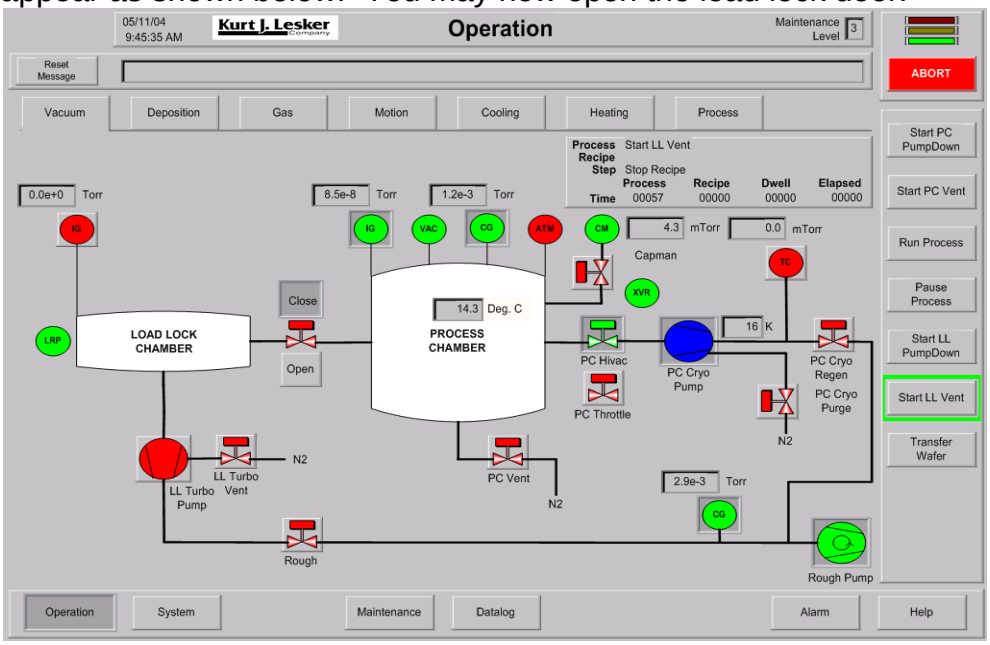
2.0 Operation

NOTE:
If you need to stop the system during a process click the red “Abort” icon below 2 times. It will turn maroon and then back to red. Then, click “Start PC Pumpdown” and wait for the recipe to display “Stop Recipe” in the **Step** field as shown below. This basically resets the system to an “idle” state.



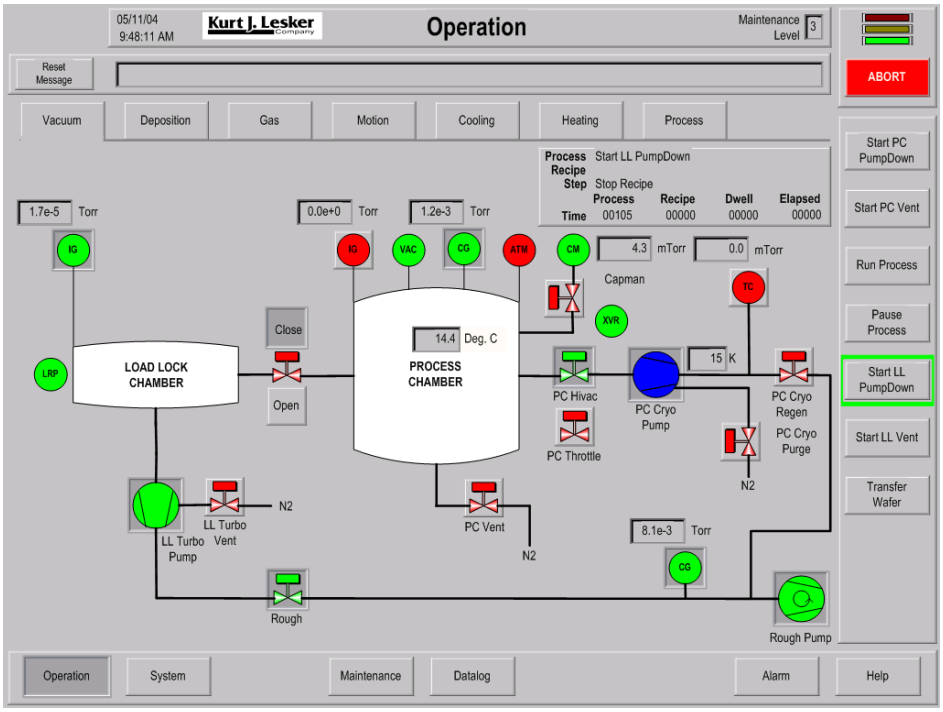
2.1 Use the Deposition screen (click the Deposition tab along the top of the screen) to verify that the target you reserved is actually loaded in the system. Call UFNF Staff if not.

2.2 Click “Start LL Vent” and wait for the recipe to display “Stop Recipe” in the **Step** field. When the load chamber is at atmosphere, the screen will appear as shown below. You may now open the load lock door.

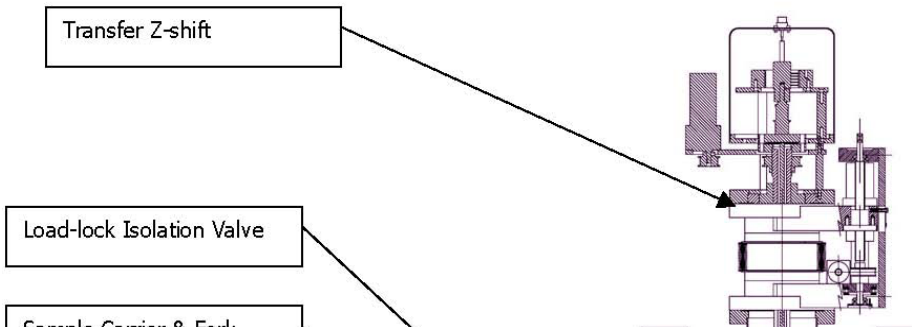


2.3 Secure your sample to the 6 inch sample holder. Use the screws and clips provided. **Caution: The sample may not extend past the height of the lip of the holder or 6mm total (this includes the sample and clip height).** ***Note: The ONLY tape that may be used in this system is 3M High-temp Polyimide Kapton Tape. If you absolutely have to use glue, the only types that are allowed are Varian Torr Seal or Kurt J. Lesker KL-325K.***

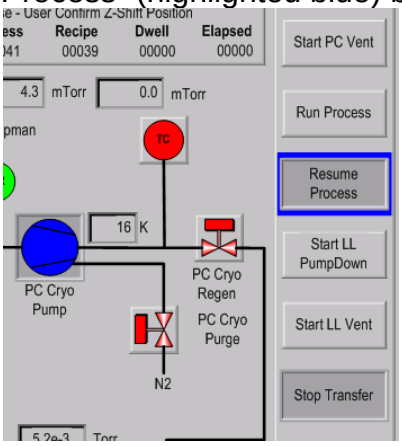
2.4 Load the sample holder "face" or "sample" down onto the load fork and shut the load lock door. Click "Start LL Pumpdown" and continue when the vacuum system pumps back down-----status as shown below.



2.5 Click "Transfer Wafer" button. When "Pause – User Confirm Z-Shift Position" appears in the "Step" field, rotate the Transfer Z shift manual knob (near the arrow depicted below) until the sample platen is lowered completely. The upper position ruler "down" line marked in pen will be lined up with the top of the lower ruler.

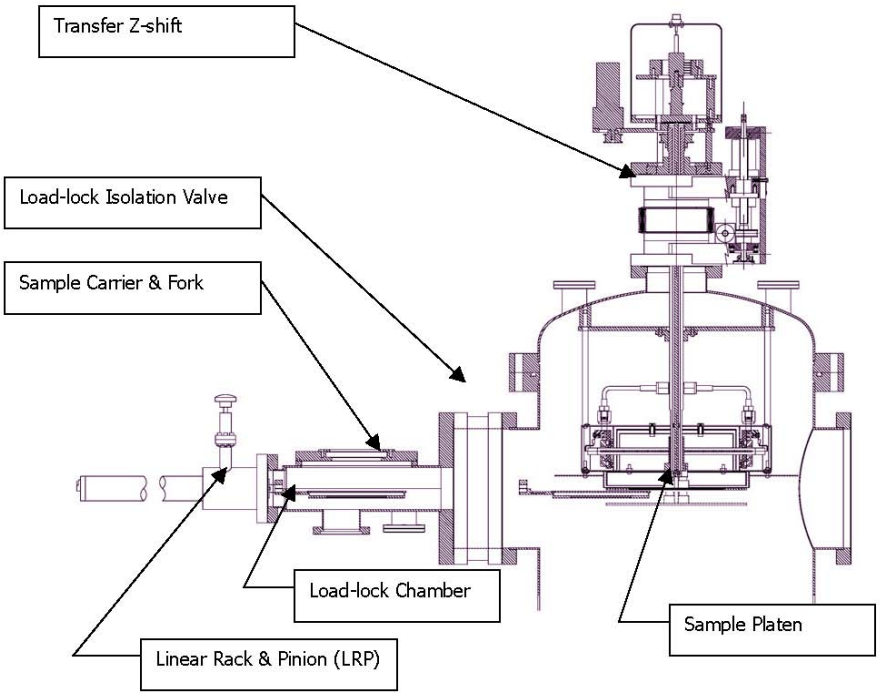


2.6 Click the “Resume Process” (highlighted blue) button.



2.7 The load lock/dep chamber isolation valve will then open. Rotate the LOAD ARM Load Arm knob until the sample is inserted completely into the process chamber. It will meet a mechanical stop.

2.8 Raise the sample platen slowly by turning the Transfer Z-Shift knob until the line on the Z-Shift ruler (upper ruler) marked “UP” is visible at the top of the lower ruler. Return the LOAD ARM to home position. If you hear anything unusual (like the sample holder falling) call UFNF Staff. Using the flashlight mounted on the control rack, verify that your sample is centered on the platen holder ring. If it is not, stop and contact UFNF Staff. If OK, click the “Resume Process” button again.



2.9 Raise the sample platen completely to the top (deposition position) by turning the Transfer Z-Shift knob.

2.10 Open the Excel Kurt Lesker Log workbook on the sputter tool desktop. You will need to use the "windows" button on the keyboard. The spreadsheet is located on top of the windows start menu if not already open. Use the "recipes" spreadsheet to determine what recipe you need to use and to determine your sputter time. See the example table below. Find:

a. your target, column A
b. the gun in which the target is loaded, column B
c. use the recipe name, column C
d. use the Dep Rate A/second in column D to calculate sputter time

DISCLAIMER: The dep rates listed in this table are not guaranteed and by best estimates only accurate to approx 10%. These values are based and different runs over time as measured on a very old Tencor Alphastep 200 profilometer. If you need high accuracy thicknesses, you will need to perform test runs and measure thicknesses. See UFNF Staff for help.

Kurt Lesker Sputter Recipe Table

Target	Gun	Recipe Name naming convention is: gun_power_pressure MT	Dep Rate A/second
Ag	2	G2_250_5	xx
Ag	4	G4_250_5	xx

Al	1	G1_350_5	xx
Al	1	G1_500_5	xx
Al	3	G3_500_5	xx
Al	3	G3_350_5	xx
Au	2	G2_150_5	xx
Au	4	G4_150_5	xx
Cr	2	G2_250_5	xx
Cr	4	G4_250_5	xx
Cu	1	G1_350_5	xx
Cu	2	G2_250_5	xx

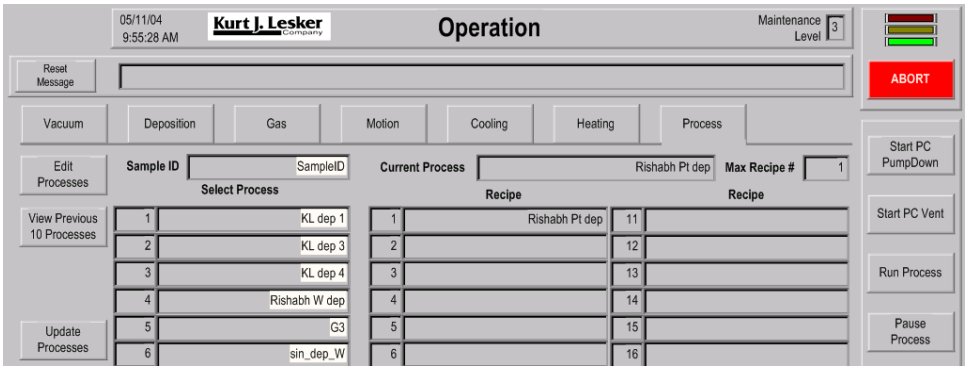
Example Table

NOTE: if the material you intend to sputter is not on this list you must consult with UFNF Staff before continuing. Sensitive or insulating materials may require a special recipe to prevent thermal shock damage. Examples of such materials are InO/ZnO, ITO, Al2O3, etc.. Overheating can cause the target to crack or cause the Indium bonding material to squeeze out the copper backing sandwich.

2.11 On the Process screen click “Edit Processes”, this will open up Access Database. On the next screen select “edit project” to the right of “University of Florida”. On the next screen, scroll down to the process you need and click “edit process”. On the next screen click “edit recipe” next to the recipe name. You are now finally looking at the actual sputter recipe. Scroll down to step 1600 “dwell for deposition” and input the desired sputter time. There is no “save” button. Close MS Access Database by clicking “exit”, “exit”, “exit” and then click the “out” door.

2.12 On the Process Tab screen click “View Previous 10 Processes” repeatedly until the “Update Processes” button appears below it. Click the “Update Processes” button and wait until it turns from green back to gray.

2.13 Select your recipe. Your recipe name should appear in the “**Current Process**” field.



2.14 Click “Run Process” to execute your process. When the recipe is at the “dwell for deposition” step, verified plasma is on by looking

through the view port window. The shutter handle is to the right of the window. Rotate the handle to look in the window.

Note: If you need to stop the system during a process for any reason such as “no plasma” click the red “Abort” icon below 2 times. It will turn maroon and then back to red. Then, click “Start PC Pumpdown” and wait for the recipe to display “Stop Recipe” in the **Step** field as shown below. This basically resets the system to an “idle” state. If no plasma was made, give your recipe one more try and then call UFNF Staff.

2.15 To unload the sample click “Transfer Wafer” and move the sample all the way back down to the platen to “UP” line as marked on the upper ruler. Click “resume process” to confirm the shift Z position. The Isolation valve will open.

2.16 Move the LOAD ARM completely back into the chamber. Lower the platen completely down to “Down” line marked on the upper ruler. Move the Load Arm back into the load lock with the sample. If your sample is not on the arm or it falls off during unload, call UFNF Staff.

2.17 Click “Resume Process”. When the transfer wafer process is complete, execute the “Start LL Vent” command.

2.18 Remove sample, close the door. You do not need to pump the load lock back down when done.

2.19 Log your end time in the KL Logbook spreadsheet on the stand alone computer near the gowning entry.

B. Lewis
3/20/09
Rev 2.0