Utility Checklist:

- N2 and CDA are on and processing gases valves open if needed
- Booster pump is plugged in
- Cooling water valves to the tools are on
- All needed power supplies from control cabinet are on
1. **Prepare sample and load samples:**
   - For 4” wafer, the substrate holder has a ring to hold it. Loosen the screws and insert your wafer. Then tighten the screws.
   - For small samples, Kapton tape can be used to load the samples.
   - Place the substrate holder face down on the transport chamber table. The groove should fit in with the edge of the table.

   ![Image of substrate holder](image1.png)

   - Close the transport chamber door and tighten the latch knob a little.

   ![Image of transport chamber](image2.png)

2. **Transfer sample holder into process chambers:**
   - Log in FOM to access the software.
   - Go to the software and log in with “user1” and password “user1”.
   - Go to transport chamber page and click next to the p320 to evacuate the chamber.

   ![Login interface](image3.png)
2.1 Loading sample:

1. Load the substrate holder back on the stage in transport chamber and make sure it properly sits.
2. Evacuate the transport chamber by clicking “evacuate” in “Pump system transport Module” page
3. Make sure Arm is at position sensor 2
4. Click "substrate inserted" at transport chamber at “Substrate table of Transfer chamber” page
5. Click "Table down". Table has to be down to enable the valve V270/V170 “open”.
6. Once the transport chamber vacuum is less than E-5 mbar, open V270/V170 valve.
7. Transfer the arm all the way to position sensor 3 VERY SLOWLY!! Moving too fast will result in substrate holder falling off the arm.
8. Visual check to confirm shutter is out of the way inside Ebeam chamber. Click "substrate up" on the “Substrate table” page.
9. Once the substrate is up, move the arm back to position 2 position sensor.

10. Click “Close” the V210/V170 valve.
11. Click "Substrate inserted!" on the “Substrate table” page.
12. Click “Shutter close”.

5
3. Deposition Process
The layout shows all the pumps and chambers. 4 targets RF and DC sputtering chamber is on the left. 2 Ebeam gun and ion source Ebeam chamber is on the right.

Utility connection:

1. Before deposition process, **MAKE SURE THE COOLING WATER PUMP IS ON!!**

2. Plug in the booster pump cord and turn on the booster pump switch.
3. Check the flow meters readings and the green lights underneath the readings should be ON!
4. Verify all the powers supplies needed are on and gas valves are on.

5. Choose “1-10 rpm” if needs substrate rotation from “Rotation Speed” at “Substrate table” page.

3.1 Ebeam Deposition Operation:

The Ebeam deposition control is through “SQC-310 Deposition Controller”. It can do automatic single/multi-layer deposition by one or two Ebeam guns. User needs to setup their specific films in “Film Menu” and deposition setting in “Deposition Control”. Then add the films into one “process menu”. The SQC-310 manual is next to the system for user to reference to.
1. Once select correct process, Press “Start” at the main screen to start the auto process. The Ebeam remote will show the HV and emission current in “automatic”. Steps showing on the controller during processing:

2. pocket rotation.
3. Rise 1, soak 1 and rise 2, soak 2
4. Shutter delay if added, deposition
5. Reach set thickness and deposition stopped and shutters closed.

4. Retrieve the sample from process chambers

1. Click "substrate shutter open" on “Substrate table” page
2. Choose “Stop Rotation” if rotation is used.
3. Click “Go to handover position”. The shaft for latching substrate holder rotates to hand over position. The icon became green.
4. If transport chamber pumps are off, evacuate the transport chamber first
5. Open the V270/V170 valves
6. Move the transfer arm into the process chamber and to engage position sensor 3
7. Visual check to confirm shutter is out of the way. Click "substrate down" in the “Substrate table” page. The shaft will lower to latch on the substrate holder stem
8. Move the arm back to load-lock at position sensor 2 VERY SLOWLY!!
9. "Close" V270/V170 valve
10. Click "Table up" at transport chamber to enable the "Vent" function.
11. Venting the transport chamber to retrieve the sample
13. Evacuate the transport chamber and wait until the pressure <E-4.
14. Turn off the transport chamber pumps by click “off” on “Pump system transport module” page.

5. Shut down procedures:
1. Turn off booster pump switch and unplug the booster pump cord
2. Turn off the power supplies
3. Log out FOM.