

	Yale University Cleanroom	Revision #	1
		Implementation Date	10/4/2022
Page #	1 of 4	Last Reviewed/Update Date	10/4/2022
SOP Owner	Lauren McCabe	Approval	✓

PVD E-beam Evaporator

1. Purpose

Standard operating procedure for the PVD E-beam Evaporator. E-beam evaporation is a thermal evaporation process, where the desired material is placed in a crucible and heated by a focused electron beam. The heat from the e-beam vaporizes the material, which then deposits on the substrate to form the required thin film

2. Scope

This SOP is intended for general purpose use of the PVD E-beam Evaporator, and do not take the place of thorough training on the system. If you are not sure of your ability to operate it, do not hesitate to contact a staff member.

3. Prerequisites

Users must have cleanroom access.

4. Responsibilities

Yong Sun	(609) 917-5076
Lauren McCabe	(609) 902-3834
Yeongjae Shin	(203) 215-9987
Kelly Woods	(203) 436-0300

5. Safety

This system uses high voltage, >5KV, operators should **NEVER** attempt to work on the internal parts of this system or remove protective panels. **Lethal voltages may exist, even with the power supply off.**

In the event of an **emergency** which requires you to evacuate the cleanroom before your run is completed, press the **e-stop button** before immediately leaving the cleanroom.

CAUTION – use care when touching inside surfaces after opening, some areas in chamber and especially near the e-gun may be **HOT**.

NEVER operate the tool in service mode. **DO NOT override any interlocks.** If the tools has been left in service mode, please see a staff manager.

	Yale University Cleanroom	Revision #	1
		Implementation Date	10/4/2022
Page #	2 of 4	Last Reviewed/Update Date	10/4/2022
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6. Procedure

Allowed Materials: There are six, 15 cc pockets available and are reserved for: Ti, Al, Nb, Au, Cu, and Pt. Do not switch out these materials without manager approval.

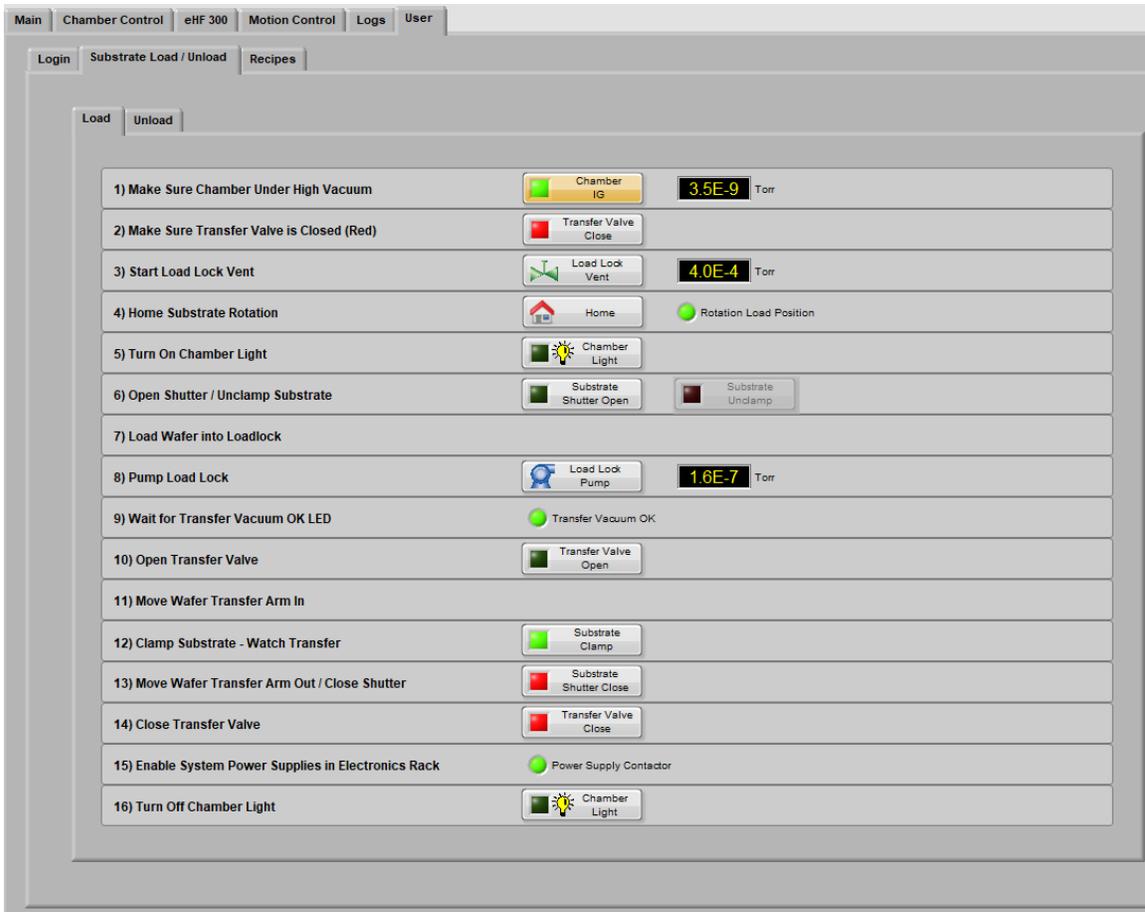
Login: Login via FOM to reserve your tool time. Navigate to the **User** tab of the PVD deposition program and go to **Login**. Login with your credentials. All the operation tabs should now brighten, ready for use.

Load Sample: Go to the **Substrate Load/Unload** tab and click on **Load**. Follow the steps closely to vent the load lock, load your sample, pump down the load lock, and transfer to the main chamber. **Note that Step 6 has two parts.**

To load your sample onto the substrate holder, use the appropriate screws and clips to hold your sample in place. When loading the holder back onto the manipulator arm, ensure the holder is properly mounted on all 3 pins of the manipulator.

When you are pumping the load lock back down, **do not transfer your sample into the main chamber until the pressure has reached E-7 range.** This will take about 45~60 minutes.

	Yale University Cleanroom	Revision #	1
		Implementation Date	10/4/2022
Page #	3 of 4	Last Reviewed/Update Date	10/4/2022
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Run a Recipe:

Navigate to the **Recipes** tab. On the right, name your film for reference purposes. Both 'Chiller' and 'Inficon' should be checked. Next to 'Inficon' type the corresponding process number for your desired film. This process number can be found on the Inficon mounted to the front of the tool, by selecting the process menu and reading the list of possible films.

If you are running a gas process, reference the eHF 300 tab for the corresponding process number. **Before running any oxygen processes, allow the chamber to cool for at least 60 minutes. You will oxidize source material that is still hot if you do not wait.**

Under 'Recipe Setup', select the red 'Recipe' tab. Input your desired film thickness. Add additional film layers as desired.

	Yale University Cleanroom	Revision #	1
		Implementation Date	10/4/2022
Page #	4 of 4	Last Reviewed/Update Date	10/4/2022
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When you are ready to run your recipe, ensure all the interlocks on the left-hand side have green lights, and select the **Start Recipe** arrow button in the top left. In the bottom left-hand corner, the current recipe process step will be indicated.

Monitor the rise 1, soak 1, rise 2, soak 2, and deposition on the Inficon. Use the chamber window to ensure the e-beam sweep is centered in the crucible. If something is wrong, abort the process and notify a manager.

Unload: Go to the **Substrate Load/Unload** tab and click on **Unload**. Follow the steps closely to retrieve the substrate holder from the main chamber and vent the load lock. **Note that Step 11 has two parts.**

Leave the workspace clean for the next user.

Log Out: Navigate to the **User** tab of the PVD deposition program and go to **Login**. Log out of your credentials. All the operation tabs should now gray out.
Log out of FOM.