1034 CVD Standard Operating Procedure

QUICK GUIDE

PROCEDURE OVERVIEW

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2. **Loading a recipe**
3. **Running a recipe**
4. **Finishing a recipe**

⚠ CRITICAL PRECAUTIONS AND COMMON MISTAKES

This instruction is written for the CVD system operating under normal conditions. If the system is not in normal operating mode, you must contact the PRISM Cleanroom Staff. The CVD computer runs the furnace through a sequence of steps specified in a written program (recipe). From the GUI panel user can enter time and temperatures in an existing recipe. Users are not allowed to modify recipes.

The CVD 1034 system consists of three process tubes. From the top, the tubes are defined as follows:

- Tube 1 – Dry/Wet Oxide (Allowed materials: Si, Quartz)
- Tube 2 – Metal Anneal (Allowed materials: Silicon, Quartz, Sapphire, furnace grown/deposited films: SiO2, Si3N4, Polysilicon, Tantalum/Tungsten/Silicon, Aluminum)
- Tube 3 – Clean Anneal (Allowed materials: Si, Quartz, furnace grown/deposited films: SiO2, Si3N4, Polysilicon)
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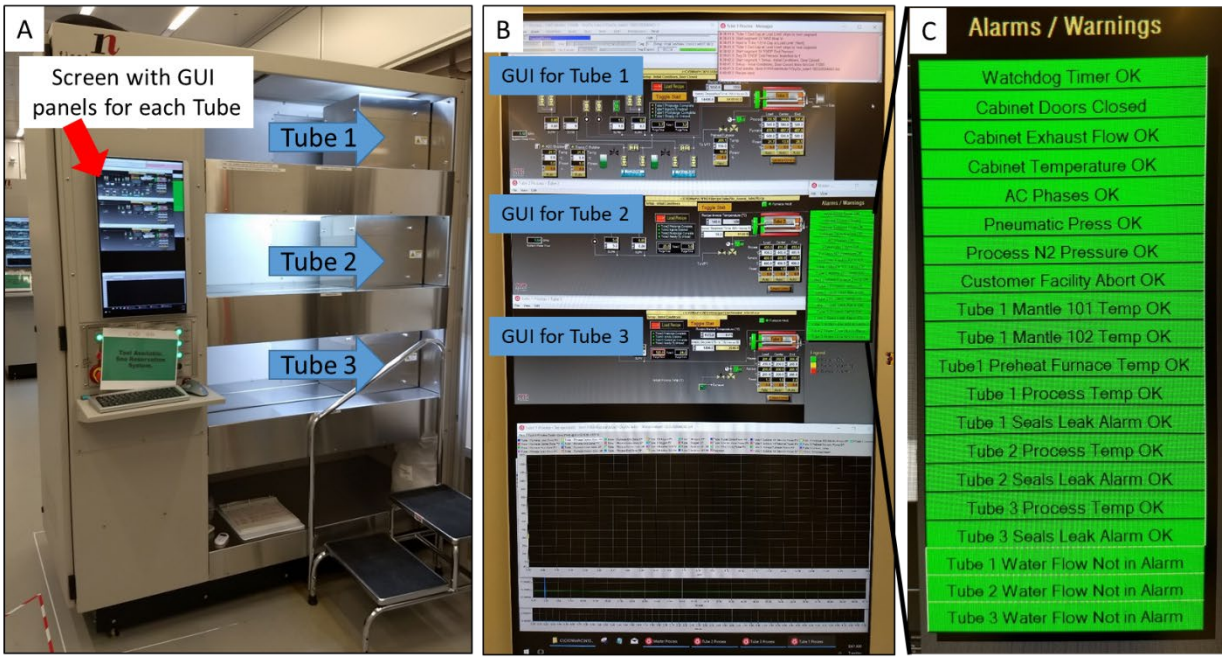
It is forbidden to put metals in Tube 1 and Tube 3. Substrates must be RCA cleaned before being placed in Tube 1 and Tube 3 of 1034 CVD furnace. Do not use metal tweezers but PTFE (Teflon) tweezers when transferring wafers and do not handle wafer boats with hands. Before placing your sample into the furnace, review “allowed materials list” located next to the tool. If you have no other way to process your sample you may request that it be added to that tool’s material list by contacting tool owner (Zuzanna Lewicka).

Notify Cleanroom Staff if planning to run Wet Oxide recipe in 1034 Tube 1 to make sure that bubbler is filled with water.

1. Before you start

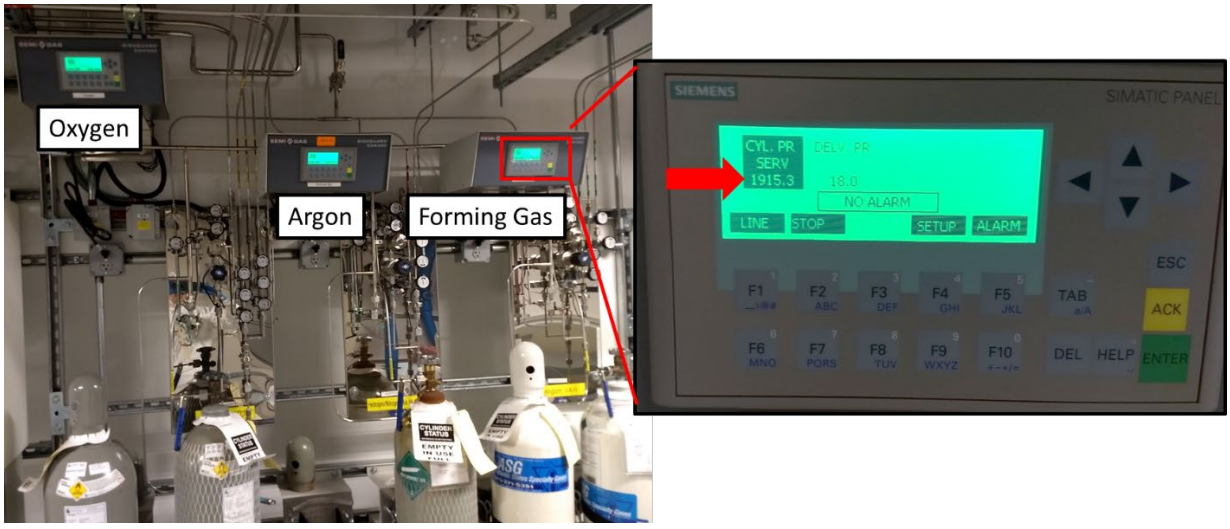
1.1 Check if GUI panels are loaded on the screen for each Tube (see Figure A and B below). If the system is not on or is not operating in a normal condition, contact the PRISM Cleanroom Staff and do not attempt to start the system without assistance.

1.2 Make sure that all Alarms/Warning in Alarm Panel are satisfied and GREEN as presented in Figure C below.



1.3 Check gas cylinder levels to make sure there is enough process gas (oxygen, argon or forming gas) for the run.

1.4 Before running wet oxide recipe, confirm with the cleanroom staff that bubbler is full.



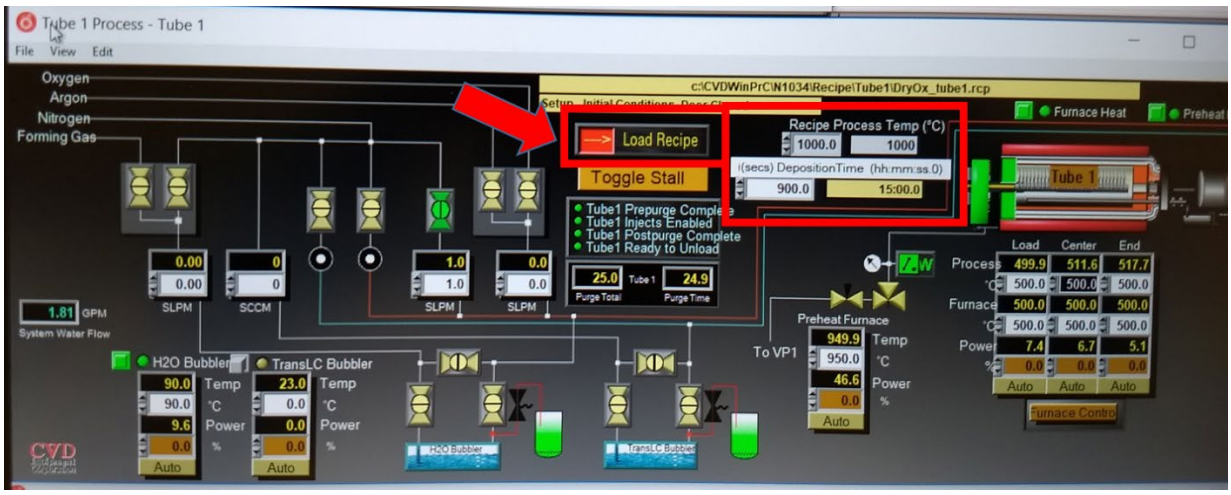
1.5 Place a few TexWipes on the stainless steel table located next to the acrylic cabinet with furnace quartzware.

1.6 Wearing clean nitrile gloves, move the glass plates and boat fork from the cabinet next to the stainless steel table and place them on top the TexWipes.



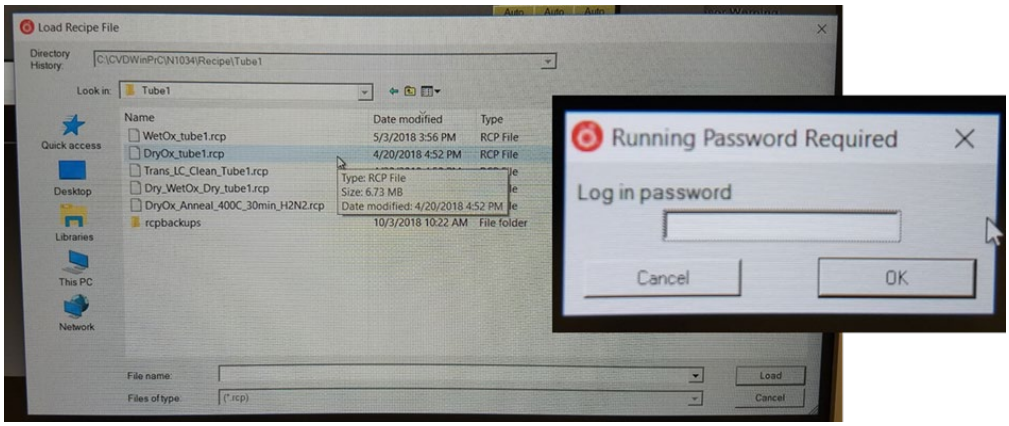
2. Loading a recipe

2.1 Select the GUI panel for the tube that you will be using and click Load Recipe tab.



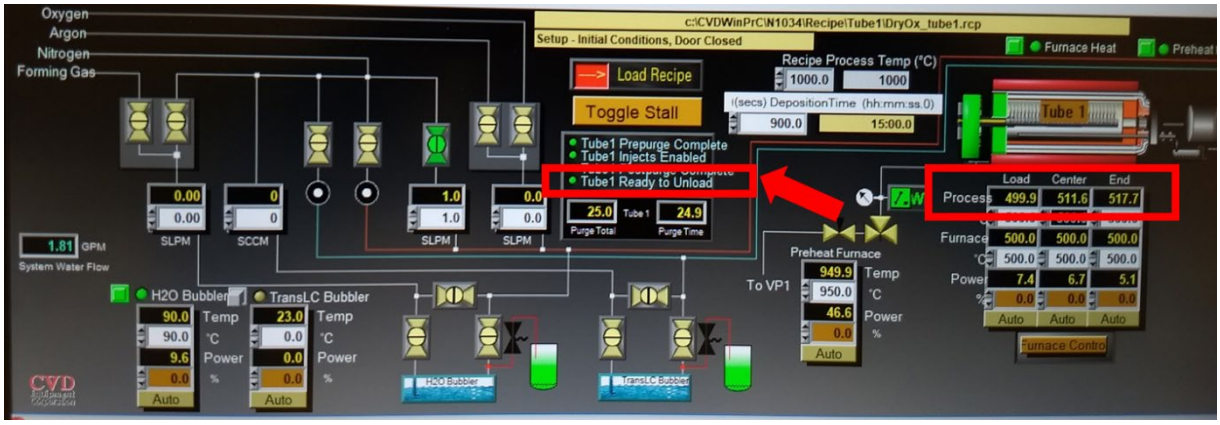
2.2 Type password: **34…Tube number…1** and load selected recipe file

2.3 Set Time and Temperatute for your process on GUI panel



3. Running a recipe

3.1 Condition: “Ready to Unload” must be satisfied as well as temperature must be below 550 ˚C to be able to open the tube.



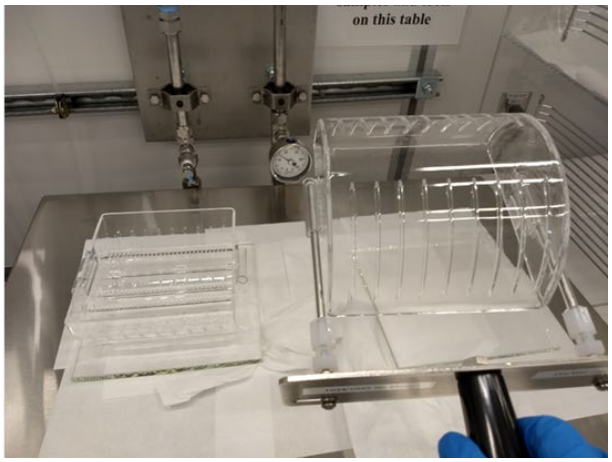
Warning! Make sure there are no items on the load station table because the loading cantilever of the tube can crush with items left on the table.

3.2 Press UNLOAD on the END CUP CONTROL to open the Tube. The boat loader should begin to come out for wafer load. Note that “Seals Leak Alarm” will become YELLOW when Tube is open.

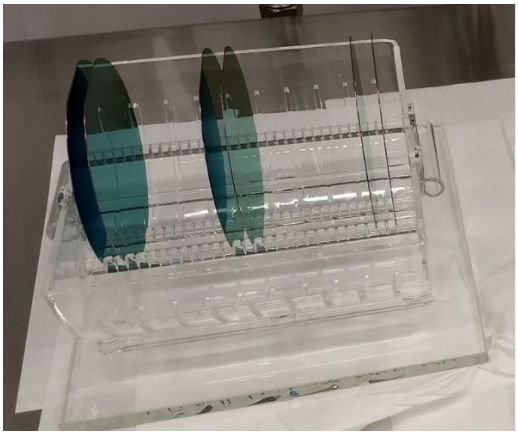
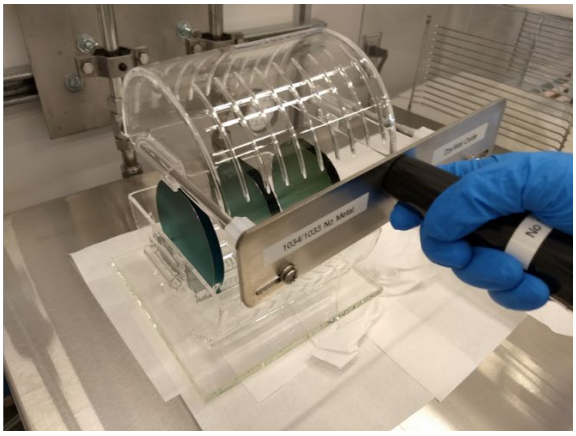
3.3 Wait until process temperature drops **<u>below 100 ˚C</u>** to remove the quartz boat from the loading arm.

3.4 Change gloves and remove the quartz boat from the loading arm using the loading fork. To do this, slip the quartz covered metal prongs of the fork through the quartz end loops of the bottom quartz boat. Then gently lift the boat from its resting spot and move it to the square pad resting on the metal bench-top.

- If there is a quartz boat lid, slip the fork prongs through the quartz end loops of the lid, lift it up and place on the plate.
- If there are wafers in the boat allow them to cool for ten minutes before moving them.

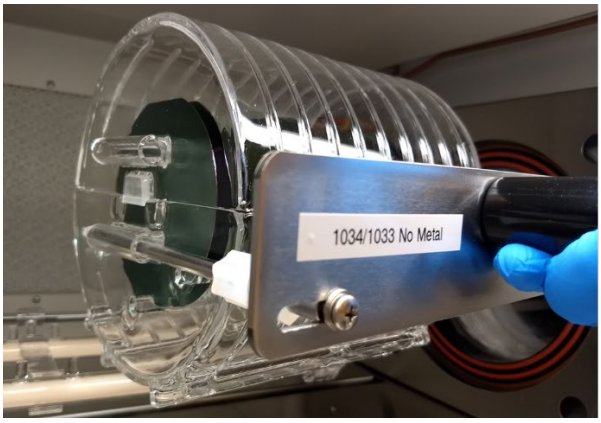


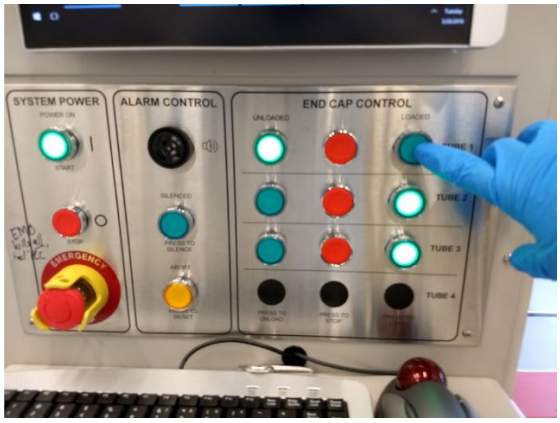
3.5 To load the wafers, place the wafers edgewise into the holding slots of the quartz boat so that they face perpendicular to the direction of the loading arm motion. Do not use metal tweezers but PTFE (Teflon) tweezers when transferring wafers.

3.6 Return the quartz boat using the fork to the loading arm, centering the quartz boat between the two end baffles. Remove the fork after transferring the boat.

3.7 Press LOAD on the END CUP CONTROL to close the Tube.



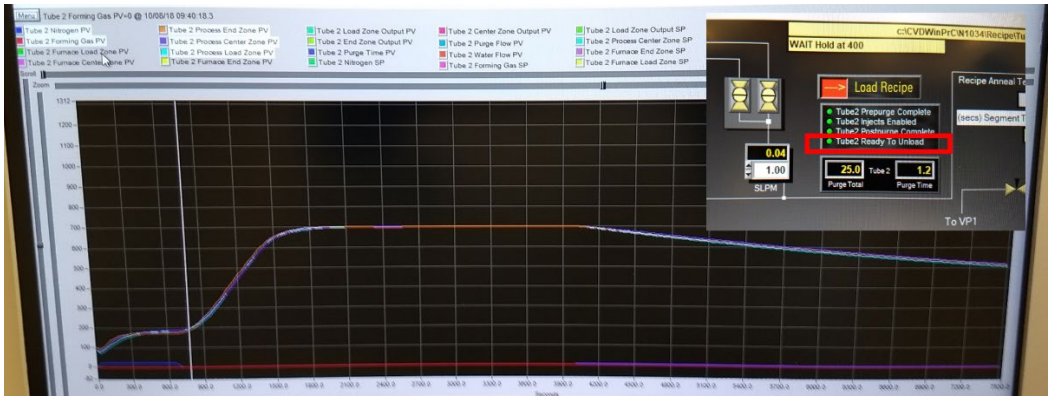


3.8 Wait until the door are closed and “Seals Leak Alarm” on Alarm Panel is satisfied and solid GREEN

4. Finishing a recipe

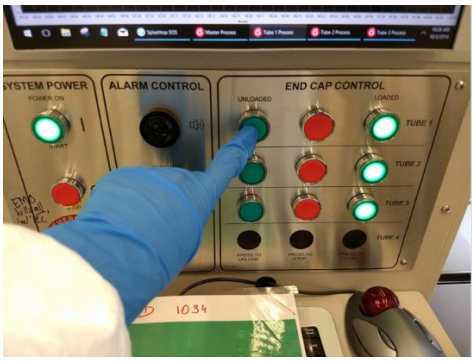
4.1 Check status of the Recipe by analyzing Graph and verify your tube is “Ready to Unload” by checking the green indicator on GUI.

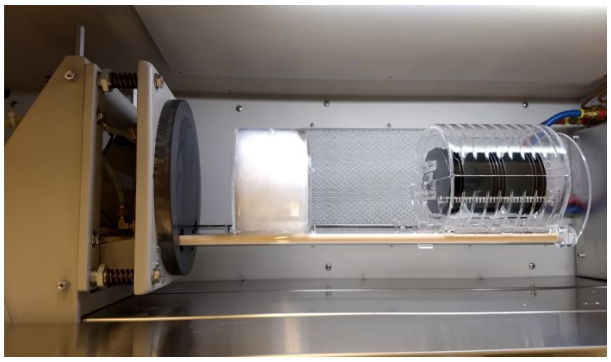
4.2 Make sure that process temperature is below 550 ˚C so you can open the tube.



Warning! Make sure there are no items on the load station table because the loading cantilever of the tube can crush with items left on the table.

4.3 Press UNLOAD on the END CUP CONTROL to open the Tube.

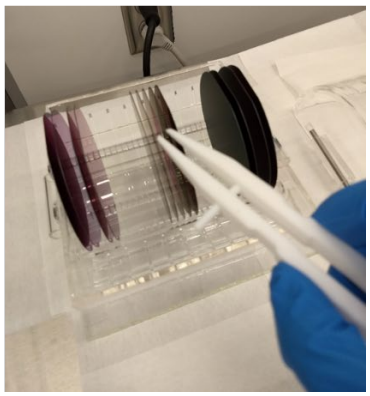




4.4 Prepare the table and place two glass plates and boat fork on top the TexWipes.

4.5 Wait until process temperature drops **<u>below 100 ˚C</u>** to remove the quartz boat from the loading arm and place it on the square glass pad resting on the table.

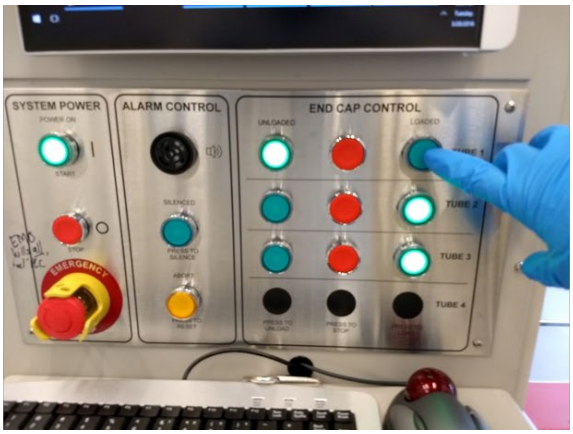
4.6 Cool down the wafers for ten minutes before moving them. Do not use metal tweezers but PTFE (Teflon) tweezers when transferring wafers.



4.7 Return the quartz boat using the fork to the loading arm.

4.8 Press LOAD on the END CUP CONTROL to close the Tube.

4.9 Wait until the door are closed and “Seals Leak Alarm” on Alarm Panel is satisfied and solid GREEN.



4.10 Make sure the recipe is completed and Tube is left in Initial Conditions by checking the status of Tube Panel: “Setup – Initial Conditions”.