

PLASMATHERM WAF'R/BATCH 74 DEPOSITION – AUTOMATIC MODE OPERATING PROCEDURE

Rev. 12/27/2001

Notes

1. Pressing **STOP** on the **CONTROL** keyboard may silence the audible alarm.
2. If the **STOP** switch on the Control keyboard is pressed while a process is running, the process will be put in **hold**. Pressing **RUN** on the Control keyboard can restart it.
3. If the **STOP** switch on the Control keyboard is pressed and held for 5 seconds the process running or in **hold** will be permanently aborted.



Venting and Loading Wafers

1. Ensure no other process is running in either chamber.
2. Ensure the chamber select key is turned to **CHAMBER 2** (right-hand chamber).



3. Turn the **MODE** key switch to **MANUAL OPERATION**.
4. On the **FUNCTION** keypad, press **MANUAL** and, while holding it, press **VENT**. The system will pump to base pressure for a short time and then vent to atmosphere.
5. When the **ATMOSPHERE** LED on the pressure status panel is lit, you may open the chamber.
6. Refer to Cold Chamber Wipe Down procedures if chamber is full of powder due to previous depositions.



7. Load your wafers and close the chamber lid.
8. On the **FUNCTION** keypad, press and hold **MANUAL** while pressing **PUMP DOWN**. The system will pump to base pressure for a short time and then vent to atmosphere.
9. The system will now be under vacuum.

Cold Chamber Wipe Down

If the chamber is full of powder use the following procedure to clean.

1. Ensure no other process is running in either chamber.
2. Ensure that the chamber is cold and the heater is off by checking that the temperature read-out on the lower left of the front of the system is off. If it is on, then press the **GREEN HEATER** button on the lower right of the front of the system.
3. Ensure that the temperature of the cooling water for **DEP** of the water recirculator is $\leq 30^{\circ}\text{C}$. If not, turn the switch beneath the read-out to **SETPT** and dial the knob until the setpoint is $\approx 30^{\circ}\text{C}$. Put the switch back to **TEMP** and wait for the readout to reach $< 30^{\circ}\text{C}$.
4. Continue with Loading procedures.

Deposition Temperature

1. Check the operation of the recirculator. If the unit is off, check the water level for each chamber.
2. To check water level, remove black covers on top of recirculator.
3. Remove large white plastic insert.
4. Use the funnel to fill tank with D.I. water.
5. Turn on recirculator by toggling and holding the **ON** switch until the unit begins operation.



- Set the temperature of the cooling water for deposition channel of the water recirculator to 60°C by toggling the switch beneath the read-out to **SETPT** and dialing the knob until the setpoint is 60°C. Toggle the switch back to **TEMP** and wait for the readout to reach 60°C.



- Press the **HEATER ON** button on the lower right of the front of the system. Check that the temperature read-out on the lower left of the front of the system is on. Adjust setting to desired temperature.

SETTING YOUR DEPOSITION TIME

- Turn the **MODE** key switch to **CHANGE STORED PARAMETERS**.
- Select the process program by pressing **PROCESS** on the **DATA** keyboard and while holding it down press the desired process number.

- Process 1 SiN Deposition
- Process 2 SiO Deposition



Press and hold **STEP** on the **DATA** panel while pressing number **5**. This is the programmed step that deposition occurs.



3. To input your deposition time, press and hold **SET** on the **FUNCTION** panel, then press **STEP TIME**. All buttons on the **DATA** panel will light.
4. Key the number pad for the desired setting. Press **ENTER** to complete the input and the **DATA** panel lights will go out.
5. Proceed to **REVIEW OF PROGRAM** or **RUN PROGRAM**.

REVIEW OF PROGRAM

1. To review each step of the process selected, press and hold **STEP** while pressing a step number (1 – 8) on the **DATA** panel. This selects the programmed step. Step #9 is dedicated to venting.
2. On the **FUNCTION** panel, press and hold **READ** while pressing a function button.

Example: press and hold **READ**
 press **PRESS SETPT**

The reading will be of the pressure setpoint for that process step.

3. To change a setting, press and hold **SET** on the **FUNCTION** panel while momentarily pressing a function button. All buttons on the **DATA** panel will light. Press the number pad for the desired setting. Press **ENTER** to complete the input and the **DATA** panel lights will go out.

Example: press and hold **SET** on **FUNCTION**
 press the **PRESS SETPT**
 key the value #.### on the **DATA** panel
 press **ENTER** on the **DATA** panel

4. Read and set, if necessary, all functions to each process step.

RUN PROGRAM

1. If wafer has been loaded and the system has reached deposition temperature, turn the **MODE** key switch to **AUTOMATIC OPERATION**.
2. Select the **process program** by pressing **PROCESS** on the **DATA** keyboard and while holding it down press the desired process number. Set the program to step 1 by pressing the **STEP** switch and while holding it down press **1**.
3. Press **RUN** on the function keypad. Hold the lid down slightly with your hand. The chamber will be pumped to base pressure (< 0.007 on the pressure status display)
4. After pressing **RUN** the system will automatically sequence your deposition. A deposition sequence should consist of the following steps: (See also the programming chart).



Step 1 Pumpdown to base pressure for 1 minutes.

Step 2 Flow N₂ at 100% with no pressure setpoint for 3 minutes.

Step 3 Flow deposition gases at deposition setpoints and no pressure setpoint for 2.5 minutes.

Step 4 Flow deposition gases at deposition setpoints and control the pressure at the deposition pressure setpoint for 2.5 minutes.

Step 5 Deposit the film - flow dep gases at setpoints, control pressure to dep setpoint, and turn on RF at dep setpoint for deposition time.

Step 6 Flow N₂ only at 100%, no RF, no pressure setpoint for 5 minutes.

Step 7 Pump to base pressure - No gas flow, no RF, no pressure setpoint for 2 minutes.

Step 8 Vent.

You may observe any parameter during the deposition by pressing and holding **READ** on the **FUNCTION** keypad and while pressing the desired parameter. Read the actual value on the **DATA** display.

VENTING AND UNLOADING THE WAFERS

1. After the process time has expired the system will vent automatically. The system will pump to base pressure for a short time and then vent to atmosphere.

[**NOTE:** If the system does not vent to atmosphere, check house nitrogen supply, turn key to manual operation, and then press and **MANUAL** on the **FUNCTION** keypad while pressing **VENT.**]

2. When the **ATMOSPHERE** LED on the pressure status panel is lit, you may open the chamber and unload your wafers.
3. Close the chamber lid, press and turn **MODE** key to **MANUAL OPERATION**.
4. Hold **MANUAL** on the **FUNCTION** keypad while pressing **PUMP DOWN**. Hold the lid down slightly with your hand. The chamber will be pumped to base pressure (<.007 on the pressure status display).
5. Leave the chamber select key switch in the **CHAMBER 1** position.
6. Reset water recirculator to 30°C. Toggle switch to **SETPT** and dial the knob until the setpoint is =30°C. Toggle switch back to **TEMP** and wait for the readout to reach <30C.)
7. Turn off the **HEATER** by pressing button on the lower right of the front of the system. Check that the temperature read-out on the lower left of the front of the system is off.

REMEMBER TO RECORD IN LOG BOOK

You are to record the follow information in the logbook:

1. Name and date.
2. Time in.
3. Pressure at start of deposition
4. Material deposited
5. Parameters of deposition such as power, gas flows, pressure.
6. Time out.