

<b>Tool Identifier</b>	<b>CMOS specific Forming gas Annealing furnaces</b>
<b>Document version 1.1</b>	<b>September 2012</b>
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### **SYSTEM INFORMATION**

Two furnace tubes are there both have Forming gas ambient and one have argon ambient additionally .

Forming gas annealing furnace – CMOS specific

### **PROCESS CONTAMINATION CLEARANCE PROCEDURE**

- For using the CMOS specific forming gas annealing furnace a process clearance is mandatory. The detailed description of your sample mentioning the materials in the sample should be mailed to the system owner.
- Professor Incharge for Contamination clearance – Prof. Anil Kottantharayil.

### **System owner**

Karthick Murukesan

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### **Authorised users:**

Meenakshi Bhaisare, Piyush Bhat, Krishnakalli

### **Training**

For training please contact system owner.

### **LOG BOOK:**

Separate log book has been maintained please make a entry in the log book.

### **STANDARD OPERATING PROCEDURE**

## **EQUIPMENT SPECIFICATIONS- CMOS specific FGA furnace**

1. Naturally cooled open tube furnace.
2. Available gases: O<sub>2</sub>, N<sub>2</sub>, Forming gas [H<sub>2</sub>(5%) + N<sub>2</sub>(95%)].
3. Ability to process up to (about 10) 2" wafers simultaneously
4. Max Temp: 1200° C.
5. Process tube inside diameter: 3 inch.

### ➤ **Start Up**

1. Turning on necessary gases.
  - First open the cylinders (O<sub>2</sub> or N<sub>2</sub> or FGA) at the micro 1 service corridor, set the line pressure to 4 bar (sometimes varies depending upon the number of instruments using the same cylinder simultaneously).
  - The gas flowing into the furnace can be controlled by flow meters present near the tube.
2. Switch on the chillers (mostly on 24\*7) & exhausts of the furnace (2exhausts – one below the pass box, second near the litho exhaust fixed on wall).
3. Open water inlet corresponding to furnace for cooling.
4. Flip the furnace power switch (to power the heating coils).
5. Flip the furnace control power switch (to power the control unit of the furnace).
6. Now the temperature requirements of centre, right, left zones of the furnace can be set (ramp up rate, mode of ramping up can also be set).
7. Set the ramp up to autotuning mode as that only works presently (updated on September 2012).

### ➤ **Process**

1. Manually open the door of load in chamber, load your wafers - typical load in temperature is process temperature as it is low around 400 degree Celsius
2. Open the required gases forming gas(some do even nitrogen annealing).  
Note: Check that only nitrogen is flowing in the furnace during ramp up
3. Use the appropriate long pull rod to slowly push the boat until centre of tube and close the furnace load in door (approximately 30 seconds to reach the centre of the furnace). Each furnace has its own long pull rod.
4. Close the Nitrogen flowing completely and open the forming gas simultaneously. Start the timer, once the annealing time is over close the forming gas and open the nitrogen. Unload the samples and allow it to ramp down.  
Note: Check that only nitrogen is flowing in the furnace during ramp down and ramp up.

### ➤ **Shut Down**

1. Unload your wafers and the boats after your process (boats may be kept inside the tube itself).

2. Close the furnace door.
3. Switch off the furnace power (as it is naturally cooled).
4. Set the furnace for ramp down to room temperature.
5. Once the temperature becomes less than 300 in all the zones, Then the gases can be closed .
6. Then the water lines & exhaust can be switched off (Chiller is 24\*7 on).

## **SAFETY INSTRUCTIONS & PRECAUTIONS**

1. When working with the furnaces makes sure you are wearing the appropriate gloves.
- 2 Never touch the hot furnace components and the wafers with gloves as it will contaminate the furnace.