

## GENERAL PROCESS AND OPERATION SPECIFICATION

### Oxford System 100 ICP 180

- I. SCOPE
  - a. The purpose of this document is to describe requirements and basic operating instructions for the Oxford Instruments System 100-ICP 180 tool for RIE. (equipment ID E2 in the AggieFab Etch Bay). This tool is intended for general purpose use to perform RIE etching on a variety of substrates and films.
- II. SAFETY
  - a. Be sure that you are trained and signed off to use this equipment.
  - b. Be sure to keep all doors and protective shields in place before operating this equipment.
  - c. Use care when operating around high voltage, RF energy or high and low temperature.
  - d. This equipment uses liquid nitrogen (LN2) for cooling of the substrate holder in the chamber. Use caution and proper cryo gloves when adjusting valves on the LN2 line.
  - e. Minimum operating temperature of substrate table/holder: DO NOT operate the substrate chiller below -100°C. This places the o-rings and seals at risk, and reduces the life of the equipment.
  - f. If you are unsure about any procedure or indication while operating this equipment be sure to contact a staff member or trainer for assistance.
- III. APPLICABLE DOCUMENTS, MATERIALS AND REQUIREMENTS
  - a. For more information about the hardware, software operating system, and general system specifications see the factory manual – “Texas A&M 94-721003 System Manual.pdf”.
  - b. Gases: This system is configured to run a variety of recipes for etching and cleaning. The following gases are available to the system: SF6, He, O2, Ar, CHF3.
- IV. OPERATION

### **Quick Guide for Normal Operation:**

- a) Log in – normal user and P/W
- b) Select “PUMP CONTROL” mode – see screen below
  - i) Press “STOP” in the loadlock menu, lower left side. See cautions below to always select “STOP” when switching between evacuate and vent modes to ensure proper sequencing of valves.
    - (1) If tool has fully completed the prior recipe cycle, including unloading the previous wafer, then no further Pop Up Menu will appear. Proceed to the VENT step
    - (2) If the previous user left after starting a utility recipe (e.g., “OPT-CHAMBER O2 CLEAN” recipe), the tool will think that a process wafer is still in the loadlock awaiting venting and unloading.
      - (a) Pop Up Menu will appear stating that the wafer is finished and ready to be removed.

- (b) Select “OK” and proceed to vent the loadlock.
  - (c) Verify that a process wafer has not been accidentally left in the loadlock by the previous user.
- ii) Press “VENT” to allow access for unloading and loading wafers.
  - (1) Various valves to isolate the turbo pump, purge the loadlock, activate the roughing and vent valves will be sequenced automatically.
  - (2) The vent process can take a couple minutes.
  - (3) When the load lock is vented the loadlock door will rise slightly.
  - (4) Open the loadlock door, remove the carrier wafer, and mount process wafer or sample.
  - (5) When the loadlock door is closed again both the rough and vent valve indicators should be closed (red on diagram)
- iii) Press the “STOP” button again to clear and reset the software.
- iv) Evacuating the loadlock
  - (1) After loading the process wafer or sample system operators with “user” status are not allowed to evacuate the loadlock manually by selecting the “EVACUATE” button on the screen below.
  - (2) Proceed to the RECIPE mode and load a run recipe.
- c) Load recipe - Select “PROCESS”
  - i) Select “Recipes” from pull down menu.
  - ii) Select “Load”
    - (1) May see Pop Up menu that asks “Overwrite current recipe...? Select “YES”
  - iii) Select desired recipe from menu list
  - iv) Edit recipe as desired
  - v) Select RUN when ready
    - (1) The Pop Up menu will ask for a name for the wafer. Be sure provide an entry for this step to avoid confusion with the software.
- d) Running the recipe. System will automatically begin the evacuation of the loadlock, activate the robot arm to load the chamber, sequence all chamber and pump valves, and begin the recipe when all parameters are in tolerance. Software will switch to the recipe screen for view progress of recipe steps.
  - i) Completion of the recipe run. Message will indicate “Process Complete” at the conclusion of a successful run.
  - ii) Follow menu instructions to acknowledge completion of the wafer run, vent and unload the wafer as in steps b. i) to b. iii) above.
- e) System cleaning
  - (1) At the conclusion of all runs done in a session by a user, the system must be cleaned prior to handing the machine off to the next user.
  - (2) Follow steps b through d once again, selecting the “OPT-CHAMBER O2 CLEAN” recipe.
  - (3) Ensure that the LN2 valves are open to allow cooling of the chamber substrate before beginning this recipe.

- (a) Cycle the small LN2 line shut-off valve closed and open again to make sure that the automatic LN2 valve is working. Without LN2, the cleaning recipe will stop when the substrate temperature reaches 50°C.
- (b) If the recipe has stopped because due to LN2 stoppage, the recipe will resume and complete normally as soon as the LN2 is available again.
- (4) Be sure to follow all steps including Venting, LIFTING the loadlock door and NAMING the wafer to avoid software confusion.
- (5) Option to logout. This process takes over 30 minutes to run. It is ok to log out and leave the system running for this step. If so, the next user will see the pop up menu acknowledging completion of the “wafer”.

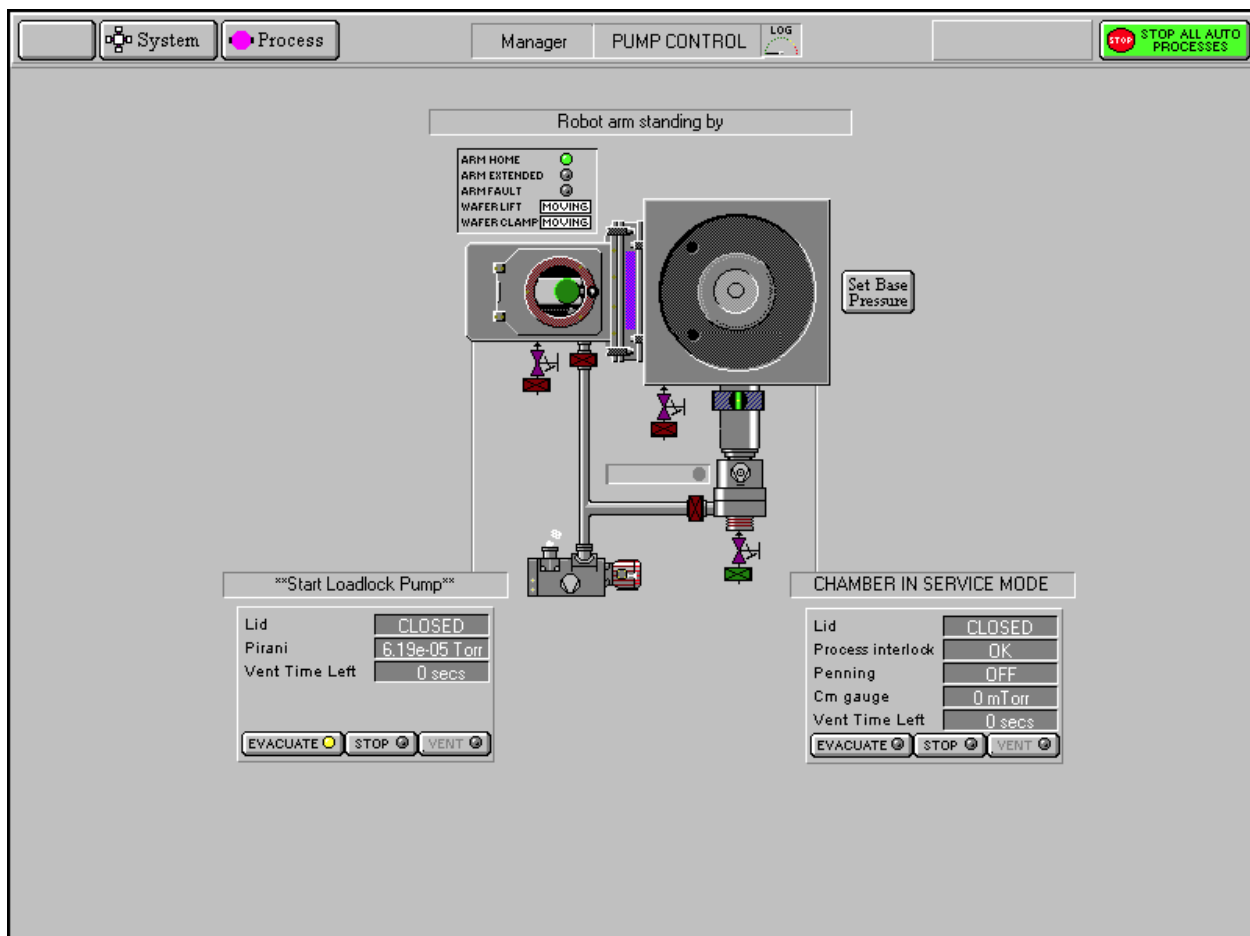


Fig 5.10 Pump Control Page (Oxford Operator Manual).

See also Section 5.8.1a:

Control and status panels for the process chamber and Automatic load lock. Each Control and status panel has associated EVACUATE, STOP and VENT buttons.

- i) **EVACUATE** buttons: Select to pump-down the associated chamber.
- ii) **STOP** buttons: Select to stop either pumping down or venting the associated chamber. **Note that the STOP button must be selected before venting to ensure the correct sequencing of the valves.**
- iii) **VENT** buttons: Select to vent the associated chamber.

- V. SIGNATURES AND REVISION HISTORY
  - a. Author of this document: Larry Rehn
  - b. Author Title or Role: Technical Manager
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