

Concept1

## STANDARD OPERATING PROCEDURE

CORAL

Name: *concept1*

Model

Number: Concept One

Location: ICL

What it does: dielectric plasma deposition

Introduction: The Novellus Concept One is a plasma-enhanced chemical vapor deposition system (PECVD), which deposits various dielectric films on silicon wafers. We have the capability to deposit oxide, nitride, oxynitride, PSG and TEOS oxide films. Dual-frequency RF plasma and multiple-station continuous processing are unique features of the Concept One. The multiple-station continuous processing sequence, which cycles each wafer through five separate but identical deposition stations, produces an averaging effect, which results in enhanced film uniformity, reduced incidence of "pin holes" and improved process repeatability. This procedure can be used for processing 4" or 6" wafer size.

- Safety:
1. Only users trained in the operation of the Concept One are allowed access to the system.
  2. The cassette door closes under pneumatic pressure. Avoid placing fingers or foreign objects between the door and the chamber edge while the door is closing. Personal injury or damage to the machine could result.

- Procedure:
1. Check Equipment Reservations in CORAL to insure that you reserved the correct machine for the correct date. Another user may have reservations. It is your responsibility to honor them, if this is the case.
  2. Use the "Engage Machine" command in CORAL or the equipment that you are about to use. Use this command BEFORE you start the operation. Insure that the correct facility is set (ICL) and that your lot name is entered correctly. Enter the number of wafers that you are processing and the film type and thickness in the comments field.
  3. Depress the foot pedal to open the cassette door. The system will automatically go through two pump and backfill cycles to purge the load lock prior to opening.
  4. Load your wafers into the standard cassette for the Concept One. Wafers have to be loaded with the side to be coated facing the double bar at the top of the cassette and the major flats facing up. Load wafers from the bottom (single bar) position up. The double bar side of the cassette must face the operator when loading the cassette onto the door, Using the center location.
  5. Depress the foot switch to close the cassette door.

Note: If you are depositing a TEOS film, TEOS runs at a lower temperature than other films, 350° C vs. 400° C. The temperature will have to be reset and it will take approximately 35 - 40 minutes for the temperature to adjust.

6. To enter the number of wafers:
  - Press F10 (MENU)
  - Press ALT W (WAFER). Enter the total number of wafers in the cassette, including any blank spaces between groups of wafers.
  - Press ENTER
  - Press END to exit
7. Ensure that you are in the desired film group, such as oxide or TEOS. This is displayed in the upper left corner of the screen. If you are not:
  - Press F3 (PROG)
  - Press F10 (MENU)
  - Press ALT G (GROUPS)
  - Press ALT T (SELECT)

- Use the up and down arrow keys to select the desired group.
- Press ENTER
- Press F10 (MENU)
- Press ALT G (GROUPS)
- Press F10 (MENU)
- Press F2 (WAFER) to return to wafer page.

8. To select the appropriate recipe:

- Press F10 (MENU)
- Press ALT S (SEQUENCE)
- Press the down arrow to "Deposit" and press ENTER.
- Use the up and down arrow keys to select the desired recipe.
- Press ENTER to select.
- Press END to exit.

Note: If viewing a recipe, it should be noted that the deposition time listed is the deposition time PER STATION. Each wafer goes through five stations. All of the conditions in the recipes have been developed with proper system operation in mind. DO NOT modify any of the listed conditions. If you have any problems with the equipment, or would like to develop a custom recipe, contact the area specialist or technician for assistance.

To start the process:

9. Press F9 (GO)

The system will automatically go into "Pre-coat" mode prior to loading wafers. The Pre-coat film is the same type as that chosen in the recipe, and its duration (usually 60-120 seconds) is recipe specific. The Pre-coat is deposited in the chamber to control particulates and cross-contamination between different types of films.

Once the pre-coat cycle is finished, the system will start to sequentially load and process the wafers, with station #1 used for loading and unloading. The wafers then proceed through five identical deposition stations.

Once the system has finished processing the wafers and placed them back in the cassette, it will sequence into the "Clean" cycle. While this is happening, the system automatically starts to pump and backfill the load lock two times. When this is done and the load lock is back to atmosphere, the wafers can be unloaded from the load lock. This is done by depressing the foot switch to open the door.

When the door is fully open, remove the cassette from the door and remove the wafers from the cassette. Replace the cassette in the center location on the door. Depress the foot switch to close the cassette door.

10. Select "Disengage Machine" in CORAL