

## GENERAL PROCESS AND OPERATION SPECIFICATION

### Laurell WS-65 Spin Coater

#### I. SCOPE

- a. The purpose of this document is to describe requirements and basic operating instructions for the Model Laurell WS-650 Spin Coater. This tool is intended for coating photoresist on samples of various sizes.

#### II. SAFETY

- a. Be sure that you are trained and signed off to use this equipment.
- b. Be sure to keep the lid closed before beginning operation. The lid is equipped with an interlock switch that prevents operation of the spinner if the lid is not closed.
- c. In order to prevent liquid from entering the vacuum path, it is crucial to keep a tight vacuum seal between the substrate and the chuck whenever liquid is applied.
- d. 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 detailed operation of this tool refer to the Laurell MCF manual – “Instruction for the Spin Coater (Model Laurell WS-650)” File name: Laurel spincoater MCF instructions.pdf. (Ask AggieFab staff for a copy)
- b. Appendix A: How to program the 650 controller
- c. Appendix B: How to Thoroughly Clean the Spin Coater after Your Use
- d. Appendix C: Features of the Laurell WS-650 Spin Coater

#### IV. OPERATION

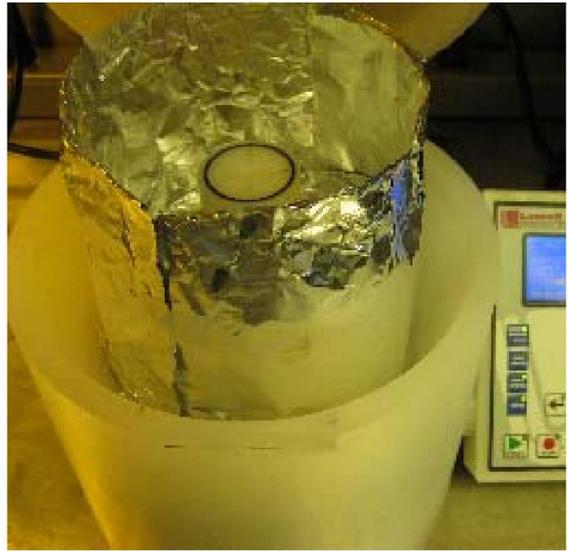
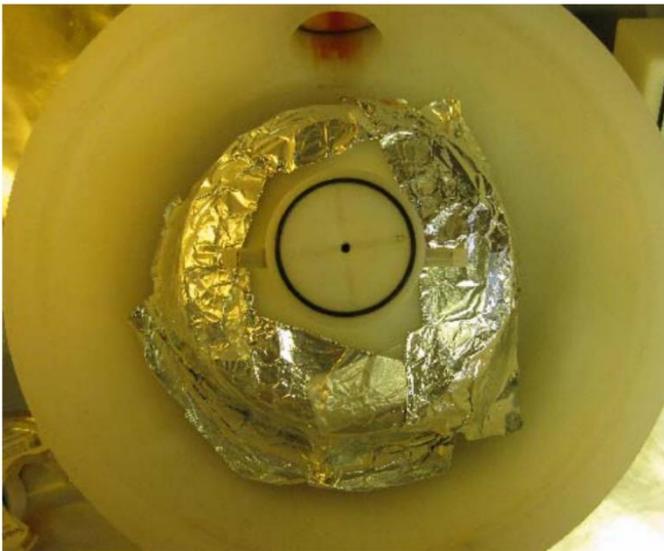
- a. Choose the right chuck adapter and O-ring according to your substrate size.
  - i. The substrate should always be large enough to cover the O-ring completely.
- b. Before you dispense the liquid, check the O-ring condition.
  - i. Make sure the O-rings are intact, clean, and fully seated in the O-ring grooves.
  - ii. Make sure that the vacuum is turned on.
    1. The switch is located on the ground to the right of the wet bench.
    2. Open the vacuum valve that is located to the right of the controller.
    3. Check the vacuum value.
      - a. The value will be in ‘Select Process’ > ‘Program’ > ‘Run Mode’ at the top righthand side of the screen.
      - b. The ‘value should say ‘Vac↑03’ when no sample is placed on the substrate holder.
      - c. It should then read ‘Vac↑14’ when a sample is placed ensuring proper vacuum.
      - d. If it reads ‘Vac↓00’ then the vacuum is off. Click the button in the middle of the controller to turn it on.

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- c. Apply as little liquid as possible onto the substrate surface.
  - i. Use only the amount that can completely cover the entire surface.
  - ii. Excess liquid will overflow the other side of the substrate, which can easily get to the vacuum path if the vacuum seal is not tight enough.
- d. Select the program to be run using the 'Select Process' key by highlighting it using the arrow keys. Then press the 'Run Mode' key to run the highlighted process. The program name will appear on the title line.
- e. For example, the following image depicts the following:
  - i. Press 'Select Process' key > highlight 'Program' with arrow keys > press 'Run Mode'



- f. Open the lid, line the inside of the spin processor bowl with a cylinder made of aluminum foil.



- g. Place and align a substrate on the vacuum chuck. Use acetone to wipe clean the O-ring and the substrate holder if dirty. Make sure the **SUBSTRATE IS LARGE ENOUGH** to cover the O-ring **COMPLETELY**.

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- h. Dispense appropriate amount of photoresist (or other chemicals) onto the substrate.
- i. Close the lid.
- j. See Appendix A for inputting program (recipe) parameters.
- k. Press the 'Start' key to start the program. Error message will be displayed when any of the following criteria is not met.
  - i. Low vacuum.
  - ii. Low compressed air pressure.
  - iii. Lid is open.
- l. A message 'Done' will be displayed on the screen when the process is completed.
- m. Open the lid.
- n. Take out the aluminum foil and place it in a plastic bag.
- o. Remove the spin sample.
  - i. Check the chuck and the O-rings.
  - ii. Clean the O-rings if dirty.
  - iii. If leakage from the O-ring seal is suspected, the O-ring needs to be removed, cleaned, reinstalled, or replaced if necessary.
  - iv. Then spin the next sample if you have more than one.
- p. Thoroughly clean up the spin coater following the guideline in Appendix B.
- q. When you are done with your work, clean up all contamination thoroughly using wipes with appropriate solvents.
  - i. Do not forget the inside of the lid, the wafer chuck, and the rotating seal.
- r. Turn off the power supply.
- s. Close the vacuum valve on the righthand side of the controller
- t. Turn off the switch to the vacuum on the ground to the righthand side of the wet bench.

- V. SIGNATURES AND REVISION HISTORY
  - a. Author of this document: Marcelo Pier
  - b. Author Title or Role: Student Technician
  - c. Date: 13 April 2021
  - d. Revision: Original
  - e. Revision notes:

Approvals:

Technical Manager Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Revision History:

<b>Revision</b>	<b>Author</b>	<b>Date</b>
Original Issue	M. Pier	13 April 2021

## **Appendix A: How to program the 650 controller**

1. In the “Select Sequence” mode, selecting an existing program will choose that program, otherwise selecting the empty line will create a new program.
2. Press the ‘Edit Mode’ key. If this is a new program, a program name will be assigned. The program name will appear on the title line.
3. Use the navigation keys (←→↑↓) to move from line to line, or the ‘Tab<’ key to move from field to field. The ‘Tab>’ keys enable the field to be editable. Make changes to the field by using the ↑ and ↓ arrow keys.
4. For example, add or delete steps by highlighting the ‘steps’ field with the ‘tab’ key, and increase or decrease the number using the ↑ or ↓ arrow keys.
5. Set the value for ‘Rpm’ and ‘Acel’ digit by digit. Switch between the digits using the ← or → arrow keys.
6. Move from one step to another using the ‘FWD’ or ‘REV’ Key.
7. The valve and sensor parameters are not applicable to this spin processor
8. When finishing programming, press the ‘Run Mode’ key.

## **Appendix B: How to Thoroughly Clean the Spin Coater after Your Use**

1. Dispose of the Aluminum liner in a plastic bag.
2. Rinse and wipe dry any remaining contamination inside the processor bowl and on the lid with acetone.
  - a. DO NOT flood the process chamber during cleaning.
3. Wipe clean the chuck surface with acetone wipes.
4. Empty liquid in the drain collector (on the back of the processor) into a waste bottle.
  - a. Wipe clean the drain collector and screw it back on.
  - b. Label any new photoresist used on the waste label.
5. Clean the outside of the spin processor.
6. Wipe clean the key pad if dirty, DO NOT spray or flush the key pad.



Please DO NOT flood this area



Please DO NOT force any liquid or compressed air into the vacuum path

## **Appendix C: Features of the Laurell WS-650 Spin Coater**

1. Digital process controller: 100-8000 rpm, with 0.5 rpm resolution,
2. Hold up to 6 inch wafer or 4 inch square substrate,
3. The 650 controller holds up to twenty 51-step programs,
4. 1.75 inch natural propylene vacuum chuck holds 50mm through 150 mm substrates
5. Fragment adapters:
  - a. Microscope slide adapter: 1"×3" microslides
  - b. Fragment adapter for holding 10mm through 50mm pieces
  - c. Wafer alignment tool
  - d. With EPDM O-rings for common solvent systems, and Viton O-rings for acids, CH<sub>2</sub>Cl<sub>2</sub>, Chloroform, THF, and toluene systems. (Please let us know when acid or toluene needs to be used.)