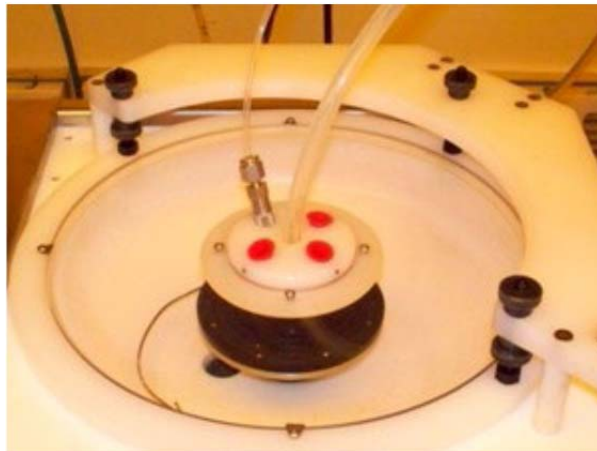


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Standard Operating Procedure

| | | | |
|------------------------|---------------|---------------------|----------------|
| Equipment name: | CEE-3 spinner | Model: | 200X |
| Badger name: | spinner-cee3 | Revisionist: | Paul Kimani |
| Location: | Bay 2 | Date: | April 25, 2013 |
| Revision #: | 1 | | |



Introduction

The CEE-3 spinner is a PC-controlled spinner with a touch screen interface and display used for applying photoresist uniformly on a substrate. It is equipped with automated dispense for backside rinse and front-side edge-bead removal. It is capable of spin speeds from 0 to 12,000 rpm and spin speed accelerations of 0 to 30,000 rpm/s. Spin speeds and time can be altered to achieve desired photoresist thickness. Substrate size capability is from < 1cm to 200 mm round. Over 250,000 recipes with multiple steps can be programmed.

Safety

- For all chucks, ensure that the notch on the chuck is aligned to the drive pin on the spindle and push the chuck all the way down
- Chucks need to be secured with the vented screw (with hole in center) that has been tightened with the provided torque hex wrench.
- Solvent filled canisters are pressurized. Do not attempt to refill them. Report empty canisters on Badger or to any NFC staff.

Restrictions/requirements

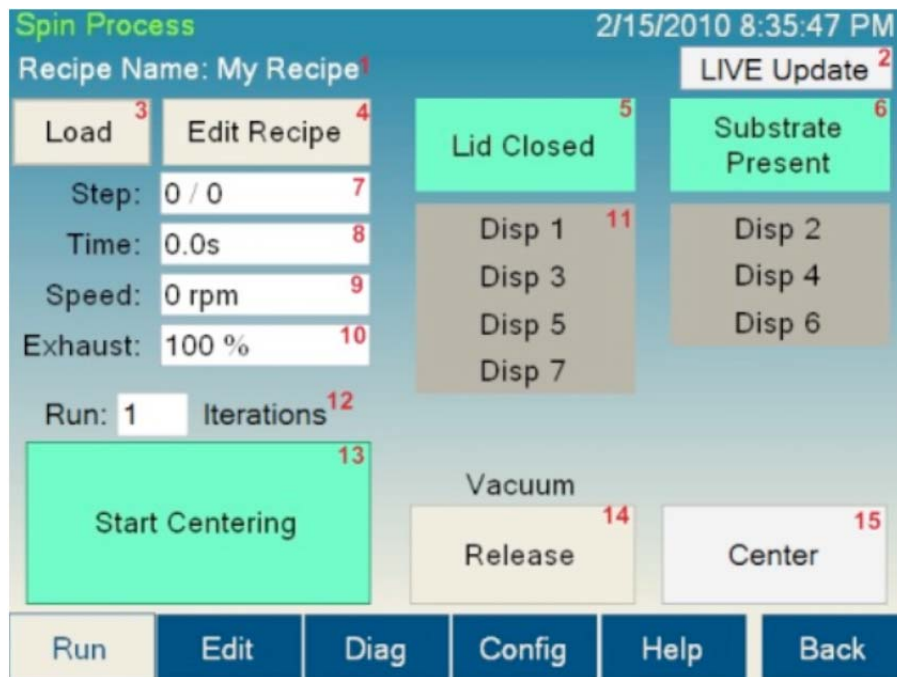
- Must be a qualified user on the CEE-3 spinner
- Use only resist or material approved for use in CEE-3 spinner. These are Shipley 1805, 1813, 1818, AZ 9260, SPR 220 7.0, SPR 955 0.7CM, Futurrex NR71 1500P, NR9 1500PY, PMMA in anisole and any other materials approved by NFC staff. All dispensed materials are held in one common waste storage tank
- Regularly used or **standard recipes are saved with 0_xxxx or 1_xxxx naming system.** These recipes will appear at the top of the list and no other recipe should precede them. Recipes that do not adhere to the above requirements will be deleted.
- Maximum spin speed (12,000 rpm) or maximum acceleration (30,000 rpm per sec) should not be exceeded

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Required facilities

- Nitrogen supply (45psi – 55psi)
- Voltage range: single phase 100 – 120V AC, 10 amps
- Vacuum source: 25” Hg
- Exhaust: 50 cfm at 0.2 water



Definitions

- Recipe Name:** The name of the currently loaded recipe
- Live update:** Not applicable to this spinner
- Load:** Brings up the TODO Recipe Select Screen to select for processing
- Edit Recipe:** This button will navigate to the Spin process Editor if a recipe is loaded. If a recipe is not loaded, it will go to the TODO Recipe Select Screen
- Lid Closed:** A lamp showing the state of the Lid Closed sensor
- Substrate Present/missing Indicator:** A lamp showing the state of the Spin Chuck Vacuum sensor
- Step Indicator:** shows the current step of the process
- Time Indicator:** Shows time remaining on the current step
- Speed Indicator:** Shows the current speed of the spindle
- Exhaust:** Not applicable to this spinner
- Dispense:** Illuminated buttons show which dispenses are currently activated
- Iterations:** Not applicable
- Start Centering:** See below under **Process Button**
- Vacuum hold/release:** this button allows the user to actuate the vacuum of the spin chuck as they center the substrate.
- Center:** Repeatable centering. Use this button to check centering at any time.

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Process Button: This has four modes:

- a. **Start Centering:** Starts the wafer spinning very slowly to check for centering on the spin chuck
- b. **Start Process:** Starts the selected process
- c. **Abort:** Aborts a currently running process
- d. **OK:** Turns off the process complete buzzer
- e. **Vacuum Hold/Release button:** Allow users to actuate the vacuum of the spin-chuck as they center the substrate.

Dispense

If a recipe has the EBR or BSR step included, solvent will flow through the dispense nozzles during the dispense step and dispense buttons will be highlighted in green. Both the backside rinse (BSR) and the edge bead removal (EBR) tanks are filled with AZ EBR solvent.

The **EBR** and **BSR** dispense nozzles can be manually moved slightly to adjust aim on the wafer so that fluid is directed at the wafer edge. Pressure at the dispense nozzles is managed from the dispense control box, and has been adjusted to minimize flow volumes.

Refill of the pressurized canisters is managed by NFC staff. Should solvent run out please inform NFC staff.

Operating instructions

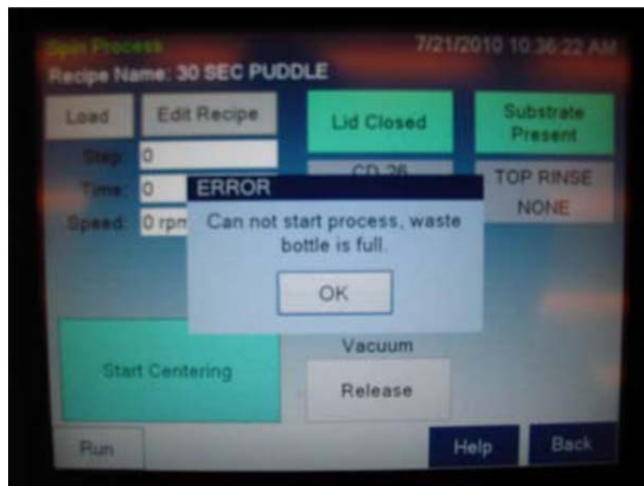
1. Log into Badger and enable spinner CEE-3
2. On the main screen, tap the **Login** button (assuming previous user logged out). This will bring up the keyboard to enter your password. User password is **1234**
3. Use only the 4" chuck. No other chucks or substrate sizes are allowed in CEE-3



4. Press the **Run Spin Process** button, to bring up the spin process window
5. To run a spin process, load your substrate on the 4" chuck (substrate should fully cover all chuck surface), then load a recipe by pressing the **Load** button. *NB: If the waste drain bottle is full, you will not be able to run any process until the waste bottle has been emptied.*

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6. A recipe **Selection Screen** will be brought up. Select a recipe by double clicking or pressing enter after your selection. NB: Recipes with either or both EBR and/or BSR steps included will be labeled as such on their recipe name.
7. Load wafer using provided centering tools (4" substrate loading depicted in the images below). Press **Vacuum Hold** to actuate vacuum on the substrate.



8. Press **Start Centering**: The spin chuck spins for the 5 seconds to test for centering. Centering can be restarted by pressing the Center button. NB: *Centering happens whether the lid is open or closed.*
9. Dispense the desired amount of photoresist onto the center of the substrate. Close the lid.
10. Press **Start Process** to begin the spin-develop process. For the duration of the process the lid must remain closed. Once the process is started, the **Abort** button can be used at any time to halt the process.
11. **Process Complete**: Once the process is completed, an audible alarm may sound. Pressing the **OK** button will silence the alarm
12. **Clean the spinner bowl lining** using acetone and cleanroom wipes until there is no residual photoresist. Excess solvent will drain to the waste bottle via a drain hole below the chuck. Do not spray acetone on the chuck center where the screw is as this may ruin the motor.

Problems/troubleshooting

1. **Substrate present light not on**: Ensure that CEE-3 is enabled on badger
2. **Spin vacuum error**: potential problems include vacuum lost during spin or spindle vacuum seal is worn out. Notify maintenance personnel.