University of Minnesota Nano Center

Spinner CEE1- Standard Operating Procedure

Badger name:	K2 Spinner CEE1	**Revision #:**	2
Model:	200X	**Revisionist:**	Laura Parmeter
Location:	Keller- Bay 2	**Date:**	April 3, 2020

Table of contents

University of Minnesota Nano Center

Spinner CEE1- Standard Operating Procedure

1. **Introduction**
   - **1.1.** The CEE-1 spinner is a PC-controlled spinner with a touch screen interface and display used for applying photoresist uniformly on a substrate. 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.

2. **Safety**
   - **2.1.** 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
   - **2.2.** All chucks except the piece chuck need to be secured with the vented screw (with hole in center) that has been tightened with the provided torque hex wrench.

3. **Restrictions/requirements**
   - **3.1.** Must be a qualified user on the CEE1 spinner
   - **3.2.** Use only resist or material approved for use in spinner CEE-1. 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
   - **3.3.** 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.
   - **3.4.** Maximum spin speed (12,000 rpm) or maximum acceleration (30,000 rpm per sec) should not be exceeded

4. **Required facilities**
   - **4.1.** Nitrogen supply (45psi – 55psi)

4.2. Voltage range: single phase 100 – 120V AC, 10 amps
4.3. Vacuum source: 25" Hg
4.4. Exhaust: 50 cfm at 0.2 water

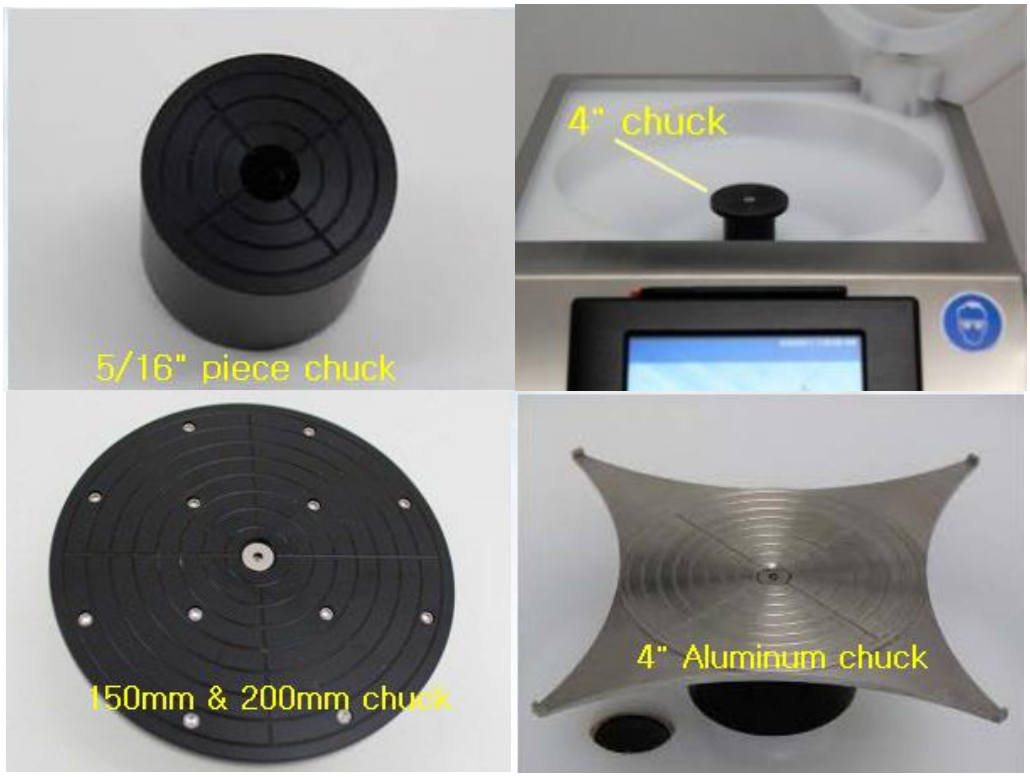
5. Definitions

5.1. Recipe Name: The name of the currently loaded recipe
5.2. Live update: Not applicable to this spinner
5.3. Load: Brings up the TODO Recipe Select Screen to select for processing
5.4. 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
5.5. Lid Closed: A lamp showing the state of the Lid Closed sensor
5.6. Substrate Present/missing Indicator: A lamp showing the state of the Spin Chuck Vacuum sensor
5.7. Step Indicator: shows the current step of the process
5.8. Time Indicator: Shows time remaining on the current step
5.9. Speed Indicator: Shows the current speed of the spindle
5.10. Exhaust: Shows the current settings of the programmable exhaust
5.11. Dispense: Not applicable
5.12. Iterations: Not applicable
5.13. Start Centering: See below under **Process Button**
5.14. Vacuum hold/release: this button allows the user to actuate the vacuum of the spin-chuck as they center the substrate.

5.15. **Center:** Repeatable centering. Use this button to check centering at any time.

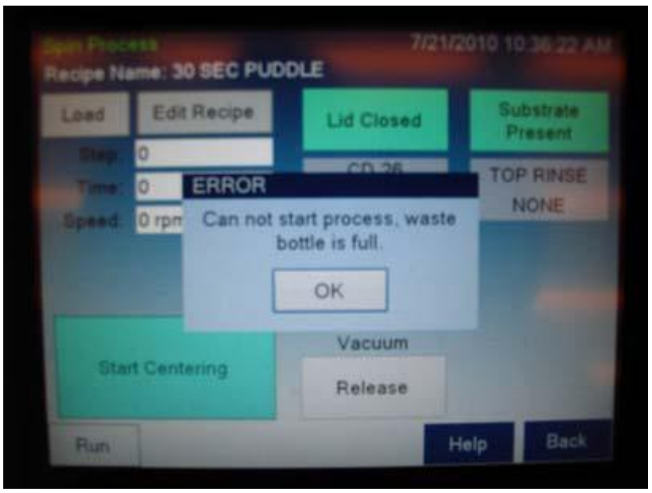
6. **Process Button:** This has four modes:
   - **6.1. Start Centering:** Starts the wafer spinning very slowly to check for centering on the spin chuck
   - **6.2. Start Process:** Starts the selected process
   - **6.3. Abort:** Aborts a currently running process
   - **6.4. OK:** Turns off the process complete buzzer
   - **6.5. Vacuum Hold/Release button:** Allow users to actuate the vacuum of the spin-chuck as they center the substrate.

7. **Operating instructions**
   - **7.1.** Log into Badger and enable spinner CEE-1
   - **7.2.** On the main screen, tap the **Login** button (if previous user had logged out). This will bring up the keyboard to enter your password. User password is **1234**
   - **7.3.** Use appropriate size chuck. Available chucks are 5/16 ” for small samples, 4” for 100 mm wafers and an additional chuck for 150mm or 200mm wafers.



   - **7.4.** Press the **Run Spin Process** button, to bring up the spin process window
   - **7.5.** To run a spin process, load your substrate on an appropriate size 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.



7.6. A recipe **Selection Screen** will be brought up. Select a recipe by double clicking or pressing enter after your selection

7.7. Load wafer using provided centering tools (4" substrate loading depicted in the images below). Small substrates can be positioned without the use of centering tools. Press **Vacuum Hold** to actuate vacuum on the substrate.

7.8. 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.*

7.9. Dispense the desired amount of photoresist onto the center of the substrate. Close the lid.

7.10. 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.

7.11. **Process Complete:** Once the process is completed, an audible alarm may sound. Pressing the **OK** button will silence the alarm

7.12. **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.

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