



# Brewer Spin Coater

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## Standard Operating Procedure

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*Revision: 1.0 — Last Updated: Sep. 8/2009 Revised by Michael Woods*

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### Overview

This document provides detailed operational procedures for Brewer Scientific CEE 200 spincoaters and associated Hotplates. Formal training is required for all users prior to using these tools.

### Revision History

#	Revised by:	Date	Modification
1	Michael Woods	9/1/2009	Initial Document Release
2	Byron Gates	9/8/2009	Formatting and editing
3			
4			
5			

Document No. 4DSOP000X



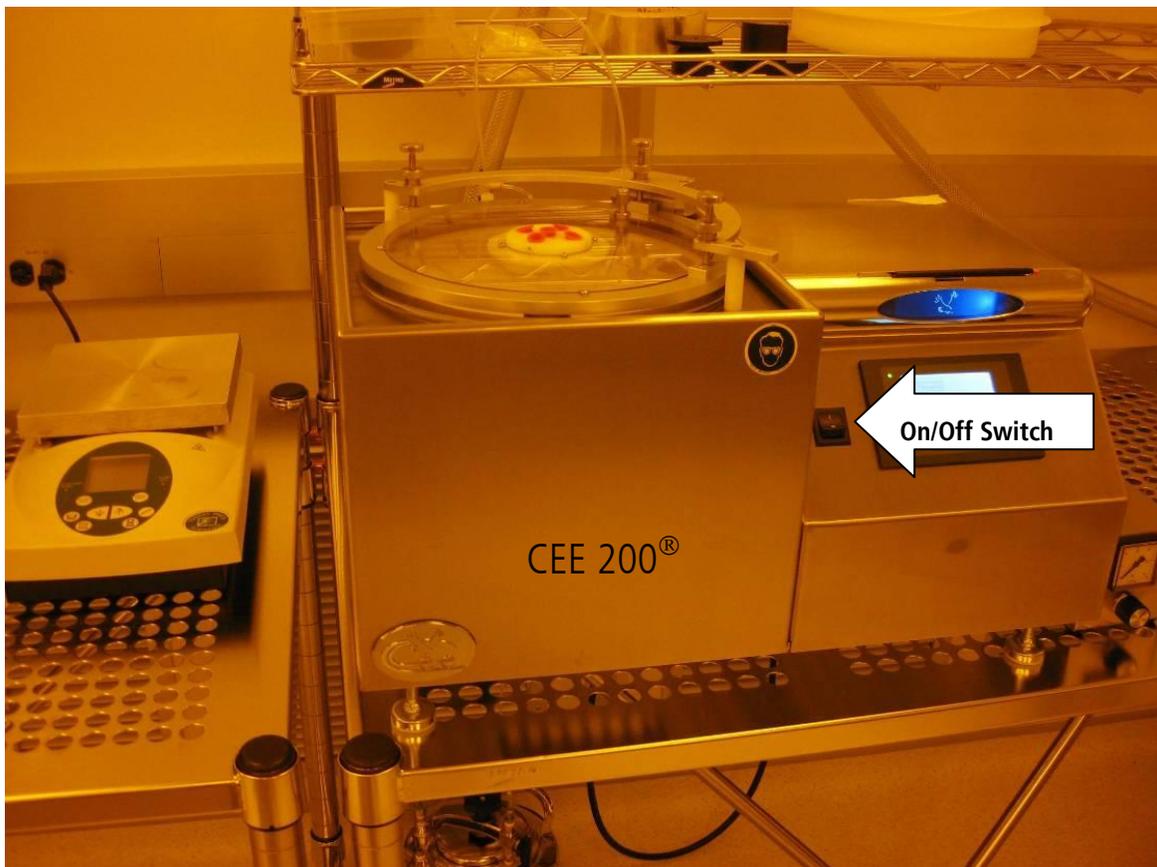
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## General Information

### 1. Description

The Brewer Scientific CEE 200<sup>®</sup> is a high performance spincoater utilized for the formation of photoresist films on clean silicon wafers. It features the ability to spin wafers at a variety of rpm to yield a range of film thicknesses. As well, Edge Bead Removal (EBR) is equipped on one of these spincoaters. Complimentary to the spincoat process, hotplates are also available. Both CEE 200<sup>®</sup> spincoaters have been balanced and should not be moved from their current locations!



*View of Brewer Scientific CEE 200<sup>®</sup> Spincoater*



## System Specifications

Maximum spin speed	6000	rpm
Maximum Ramp	30,000	rpm/s
Speed Accuracy	+/- 1	rpm
Max. substrate that will fit in bowl	200 mm	
Recipe storage	> 20	Recipes
Power	100-120	Volts AC- Single Phase
Weight	40	Pounds

## Safety Harzards/Precaution

Note that servicing of the spin coaters is only to be done by qualified Nanofabrication Facility staff. The spin coaters have been set-up and optimized in their present locations. Moving the spin coaters will require reoptimization of these tools. If you have any concerns with this equipment, please report your concerns to the Nanofabrication Facility staff. For the staff working on these tools, the CEE 200® is very heavy. Proper precautions should be taken when handling the machine to minimize risk of injury. High voltage is present in the machine. Disconnect the power before servicing. Stored electrical energy is present in the machine. Before servicing allow sufficient time for discharge. The servo amp has a charge light; do not service the machine until this light has gone out.

## General Operating Procedure

### 1. Preparation and Wafer Cleaning

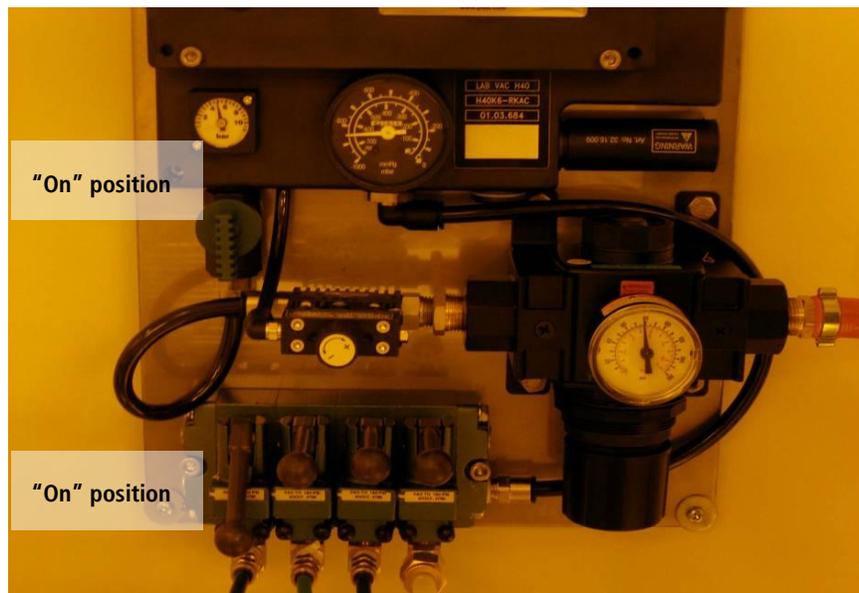
- "Sign-out" the hotplates/ovens you require for your spin coating work on clipboard provided.
- Turn on "Signed-out" hotplate(s)/oven(s) and set them to your desired temperature.

Photoresist	Softbake temp. and duration	Hardbake temp. and duration
AZ MiR 703(19cps)	90 °C for 60 seconds	110 °C for 60 seconds
PMMA A7	180°C for 60 seconds	-
PMMA A2	180°C for 60 seconds	-

- It is suggested that 2" and 4" wafers be oxygen or argon plasma stripped prior to spincoating of photoresist(see 4D LABS staff for training). Alternatively, wafers can be solvent rinsed at the wet bench using acetone then isopropanol and dried under a stream of nitrogen gas.

## 2. CEE 200<sup>®</sup> Spincoater Operation

- Press the "On/Off" button to turn on the spincoater
- To start vacuum, turn the two valves on the venturi to the "On" position (see picture below)



- Confirm lid height is appropriate for the photoresist you will be using. For CEE 200<sup>®</sup> spincoaters, the lid height is predetermined and is photoresist dependent.

### Lid Height Settings

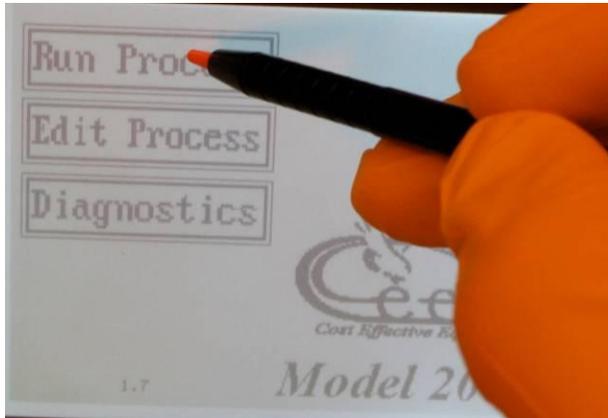


1.1 cm (PMMA A7 and PMMA A2)

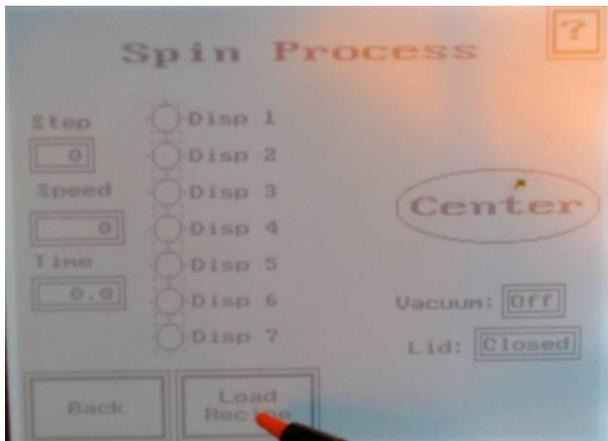


2.0 cm AZ MiR 703

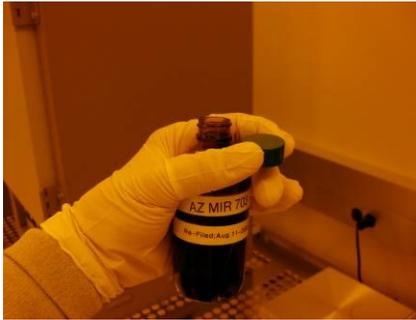
- Ensure the substrate chuck is appropriate for the substrate being used.  
e.g., DO NOT use a 4" wafer chuck with 2" wafers  
Change wafer chuck if required using designated hexagonal Allen keys.
- Confirm all top vent red plugs are in place. Restriction of vertical airflow is integral in ensuring film uniformity.
- Enter "Run Process" screen by touching LCD screen with the stylus.



- In the "Run Process" menu, select "Load Recipe" and select the desired recipe.

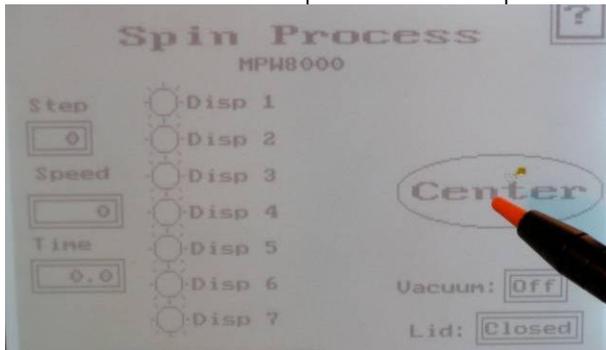


- Confirm hotplates are at the desired temperature.
- Using the substrate alignment jig, set wafer on chuck taking care to not bump or contaminate the wafer.
- Carefully remove the screw-on cap from photoresist bottle. To limit contamination of the bottle, hold the cap in the same hand with the lid pointing down (as shown). Once photoresist is dispensed, quickly replace photoresist bottle lid to prevent excessive evaporation of solvent from photoresist bottle.

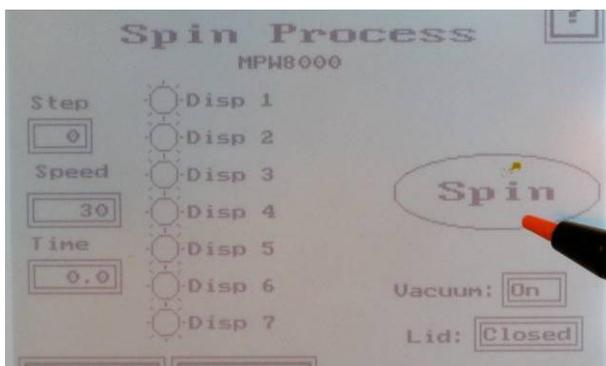


***Recommended technique to prevent micro-contamination of photoresist bottle***

- With a disposable pipette, condition bowl liner with one aliquot of photoresist. Bowl liner conditioning aids in achieving optimal reproducibility between samples. Ensure the photoresist has enough time to cover the bowl liner with a thin film of photoresist.
- With a new pipette, and the spincoater lid in the up position, carefully dispense a full aliquot of photoresist. One aliquot (3-5 mL approximately) is sufficient to spin coat a 4" wafer.
- Carefully close the lid to avoid displacing the wafer from its current position or knocking dust onto your sample.
- On the LCD touch screen, press "Center". Allow the wafer on the chuck to rotate 2-5 seconds to allow photoresist to disperse across the wafer.



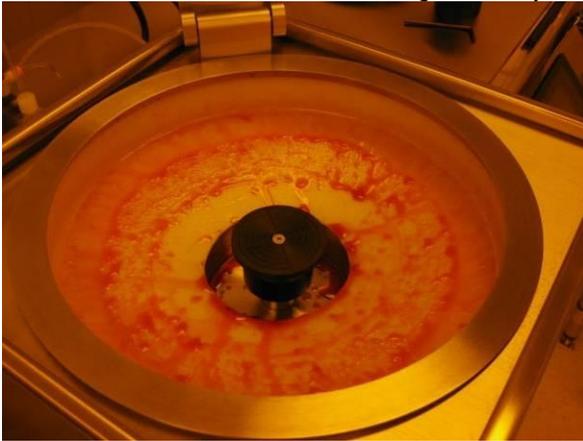
- On the LCD touch screen, press "Spin."



- Once the process is complete, carefully lift the lid as to not contaminate the wafer surface. Using tweezers, transfer your wafer to the pre-heated hotplate and heat for the appropriate duration to remove the solvent.

### ***3. Shutdown and Cleanup***

- Once finished, turn off both hotplates and the spincoater.
- Turn off the venturi pump.
- "Logout" on Hotplate Sign-in sheet.
- Remove bowl liner and metal ring assembly.



- Separate the metal ring from the bowl liner and place the dirty liner on a cleanroom wipe (see below).



- Clean bowl liner and metal ring with acetone and cleanroom wipes.
- Reassemble and replace the metal ring and cleaned bowl liner in the sample bowl.

Note: Underside of spincoater lid can be cleaned with a cleanroom wipe and acetone if necessary



## References and Files

Spincoater Operation Document; CEE 200<sup>®</sup> with AZ MiR 703, PMMA A7, or PMMA A2 (2% PMMA A7 diluted in Anisole)

## Contact Information

Questions or comments in regard to this document should be directed to Grace Li ([li@4dlabs.ca](mailto:li@4dlabs.ca)) or another Nanofabrication Facility staff member in 4D LABS at Simon Fraser University, Burnaby, BC, Canada.