

# Standard Operating Procedures

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## Spin Coater

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# Important

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- Be sure to follow proper clean room and chemical-handling procedures, including use of the correct chemical hoods.
- You can only use CeNSE laboratories and equipment if you have been approved by Brian or Chuck, reserved the tool on the calendar, and filled out a form. No Exceptions!
- If the equipment is acting unusual STOP! Please discuss with Brian or Chuck before proceeding and leave a note on the machine.
- Any accidental damage must be reported immediately.
- All CeNSE laboratories are protected by video surveillance.



# Spin coater and chucks



Figure 1a: Spin coater chucks

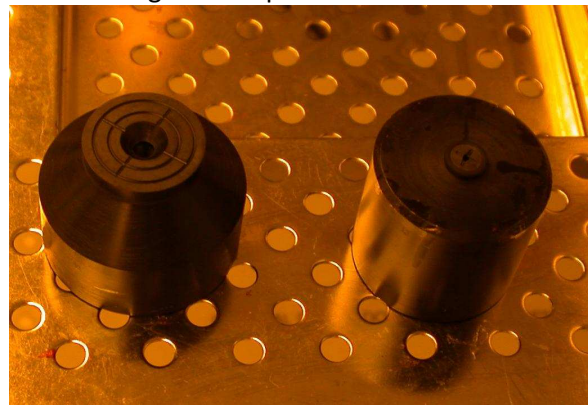


Figure 1b: Inserting the chuck



# Vacuum pump and valve

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Figure 2a: Vacuum pump

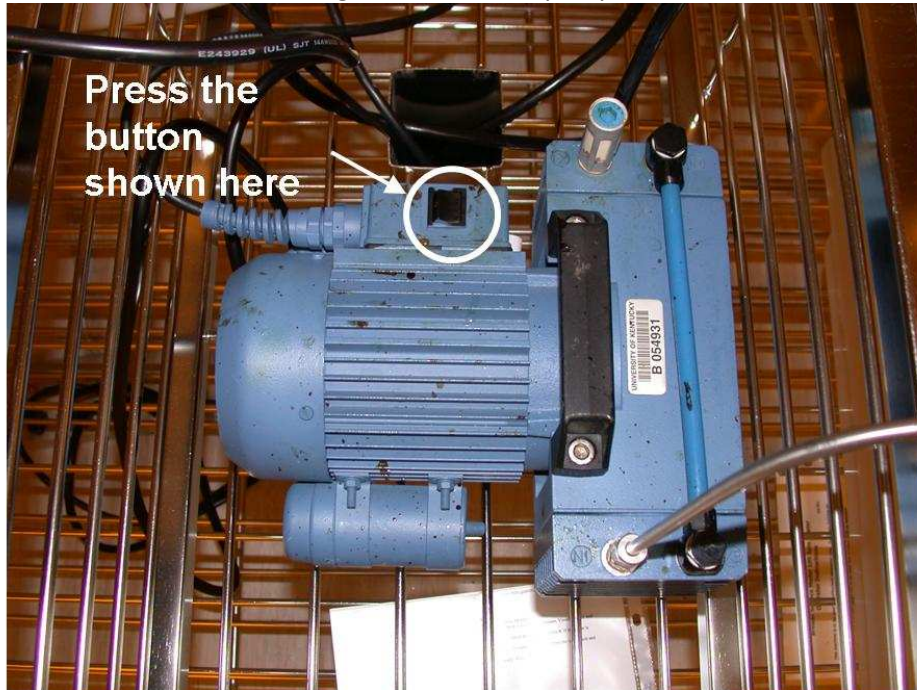
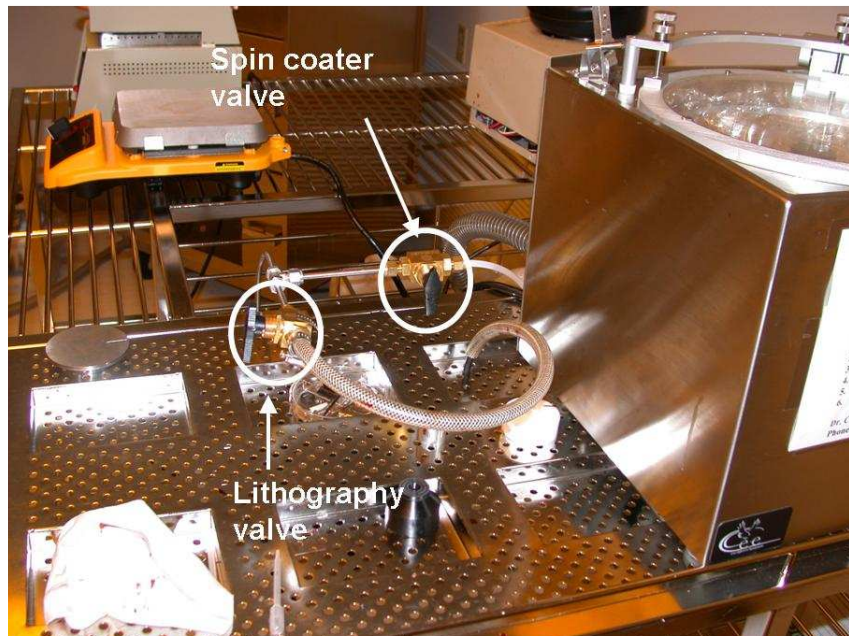


Figure 2b: Vacuum valve



# Machine operation

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Figure 3a: Valve operation

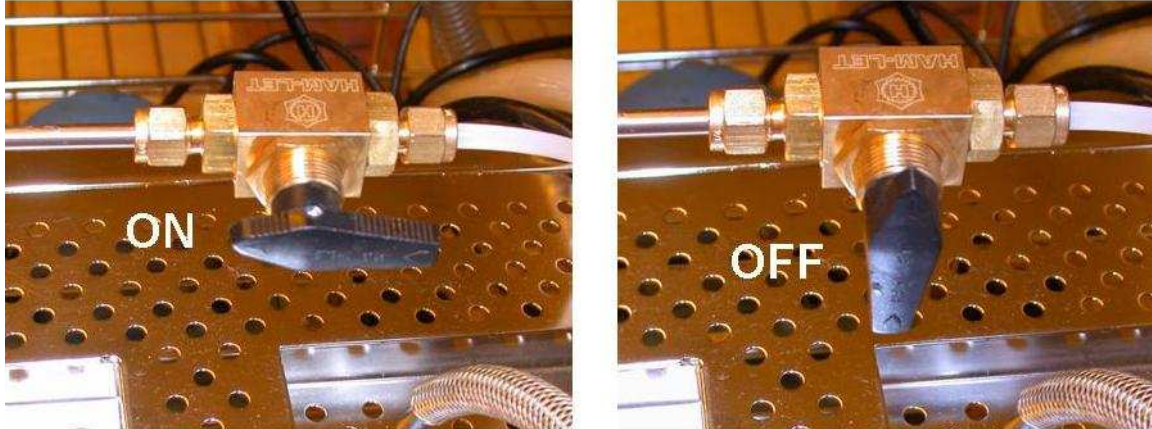
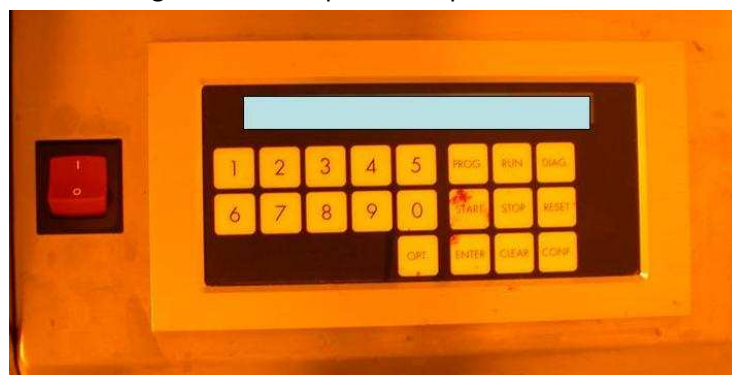


Figure 3b: Placement of sample



Figure 3c: Front panel and power button



# Machine operation, continued

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Figure 4a: Applying the coating solution



Figure 4b: Closing the machine cover



# Operating Procedure

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## 1. Preparation

### 1.1. Degrease the sample:

- 1.1.1. (Note: this step is optional depending on user preference and process conditions.)
- 1.1.2. Immerse the sample in Acetone for 2-3 minutes, followed by Isopropanol for 2-3 minutes and rinse in DI H<sub>2</sub>O. Dry using N<sub>2</sub>.
- 1.1.3. Bake on a hot plate for 2-3 minutes at 120 to 130 °C.
- 1.1.4. Place the sample on any metal surface (bench) to cool in air for at least 2-3 minutes.

### 1.2. Select spin coater chuck size:

- 1.2.1. There are three chuck sizes for the spin coater. Pictured in figure 1a are two commonly used chuck sizes (for 2 inch wafer - left, and samples around 1 inch size – right). The rule of thumb is to use a chuck in which the sample is *slightly larger* than the chuck.
- 1.2.2. Place the chuck into the spin coater's chuck holder as shown in figure 1b. Fit the groove of the chuck into the protruding pin-like shape on the spin coater.

## 2. Load the sample

- 2.1. Turn on the vacuum pump located next to the spin coater (figure 2a).
- 2.2. Open the spin coater valve (figure 2b) to the horizontal position shown in figure 3a.
- 2.3. Place the sample in the middle of the chuck as shown in figure 3b.
- 2.4. Turn on the power of the spin coater located on the front panel (red button). The display should read: *CEE – 100 AUTO DISP*

## 3. Align the sample

### 3.1. Select a spin speed:

- 3.1.1. There are 6 pre-set spin speeds from 1000 rpm to 6000 rpm (Program number 1 to 6). The spinning time is set for 30 seconds.
- 3.1.2. Press the 'RUN' button and the numeric keypad corresponding to the spin speed required, followed by the 'ENTER' button.
- 3.1.3. If different spin speed and time is required, contact Dr. Chuck May or Brian Wajdyk.

### 3.2. Initiate the spin process:

- 3.2.1. When the front panel displays the following message: *PRESS START – SPIN*, press the 'START' button to initiate the spin process.
- 3.2.2. The display will show the following message: *TESTING CENTERING*
- 3.2.3. Note that this initial spin is a low speed spin for sample alignment purposes. Once the spinning process stops, user could proceed to the next step or adjust the position of the sample. The display will then show the following message: *0 TO RETEST / START*
- 3.2.4. To repeat the position/alignment test of the sample, press the numeric '0' button. This step is repeated until user is satisfied of the alignment/position of the sample.
- 3.2.5. **CAUTION:** The spin coater is equipped with a vacuum self-check system, where if there are insufficient vacuum present, the spin process will not be initiated. Instead the display will show the following error message: *ERROR – POOR VACUUM*.  
If this happens, check the vacuum valve as well as the vacuum pump to ensure the vacuum line is activated. In addition, sample sizes that are smaller than the chuck size could also contribute to the poor vacuum condition.

# Operating Procedure, continued

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## 4. Apply the coating solution

- 4.1. Once the alignment process is completed, apply the coating solution using a dropper as shown in figure 4a:
  - 4.1.1. For regular coating solution such as low viscosity photoresist, the coating solution should cover at least 2/3 of the sample surface. This condition, however, does not apply to all types of coating solutions--especially highly viscous solutions. The user should read the data sheet of the material provided by the manufacturer.
- 4.2. Close the cover of the spin coater immediately after the coating solution is applied.

## 5. Run the spin process

- 5.1. Press the 'START' button to initiate the spin process. The front panel display shows the spin speed used as well as a countdown timer: *RPM XXXX D1 TIME XX*
- 5.2. When the machine beeps:
  - 5.2.1. Close the vacuum valve as described in step 2.2 (vertical position – off).
  - 5.2.2. Open the cover and remove the sample once the beeping sound stops.
  - 5.2.3. If another spinning process with the same condition is required, repeat the process from step 3.2.1. If however, a different spinning condition is required, press the 'RESET' button from the front panel and continue from step 3.1.1.

## 6. When you are done with the machine

- 6.1. Turn off the power to the spin coater as well as the vacuum pump.
- 6.2. Always keep in mind to leave the equipment used in the clean room in the same condition as when first entering the room.