



## Standard Operating Procedure: Photoresist Workstation

Cee X-Pro II

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## 1. Lab Safety Information

- ✓ All GMU NFF users are required to complete the Lab Safety Orientation (LSO) before performing any lab work.
- ✓ Proper Personal Protective Equipment (PPE) should always be worn before entering the clean room: safety glasses, hair net, shoe covers, gloves, and lab coat. Additional PPE is available for specialized chemical work as needed.
- ✓ No shorts, sandals, tank tops, or spaghetti-strap shirts are allowed in the clean room!
- ✓ Material Safety Data Sheets (MSDS) are available in a binder in the gowning room.
- ✓ Read the SDS for any chemicals you plan to use before proceeding with your work. Any materials used in the clean room for the first time should be brought in after the approval of NFF staff.
- ✓ A safety buddy is required in the clean room with you when doing chemical work. They must remain in the clean room the entire time you are handling the chemical. Feel free to ask NFF staff if no one qualified is available!
- ✓ Prohibited clean room items: cardboard, pencils, cloth, hats/coats, and contact lenses.
- ✓ Accepted clean room items: plastic, pens, synthetic fabrics, clean room paper.

## 2. Workstation Safety Information

- ✓ Any irregular system behavior should be reported to NFF staff promptly. Never attempt to fix the system yourself!
- ✓ Only open the sash high enough to allow access to the different modules. Close the sash when not actively putting your hands and arms into the workstation.
- ✓ The workstation has an alarm that monitors exhaust through the workstation. There is an audible alarm as well as a light. If the light or alarm goes off while using the workstation, close the sash, stop your work, and report the issue to NFF staff.
- ✓ The substrate being coated with resist sits on a chuck and is held down with vacuum. Proper chuck selection is very important. The substrate must cover the surface of the chuck to prevent chemicals from being pulled into the spin coater. NFF staff will assist you with proper chuck selection during training. This is also true of the develop module.
- ✓ Gloves can become contaminated when loading wafers or removing wafers. Always check your gloves and replace them when necessary.
- ✓ Failure to use the system safely and properly may result in your access to the system being reviewed and/or revoked.
- ✓ If a new recipe is required ask for assistance from the NFF staff.

### 3. Workstation Information

In the photolithography process, resist must be applied and baked before exposure. After exposure, the resist is developed. All of the individual steps are performed in the workstation. Workstations available for positive and negative resist processing. Positive workstation has a spin coater, hot plate and developer. Negative workstation has a spin coater, two hotplates, and a developer. Substrate sizes from 1" to 150 mm diameter.



#### **4. Photolithography Process Flow**

This is not intended to be an in-depth guide to photolithography, but a simple outline of the steps involved. There are several steps to the photolithography process. Each step is simple but proper execution is required for a successful result. The steps of the photolithography process are (in order):

1. Coating of the substrate with photoresist.
2. Baking the resist prior to exposure.
3. Exposing the resist in an exposure tool (see the SOP for the Suss or Heidelberg)
4. Baking the resist after exposure (optional)
5. Development of the exposed resist.

## 5. Operation

### 5.1. Spin Coater Operation

1. The home screen of the spin coat module is shown in Figure 1. The recipe progress screen is shown in Figure 2. The recipe progress screen is useful for monitoring. To switch between the two screens simply press the home icon or the progress icon (looks like three lines).

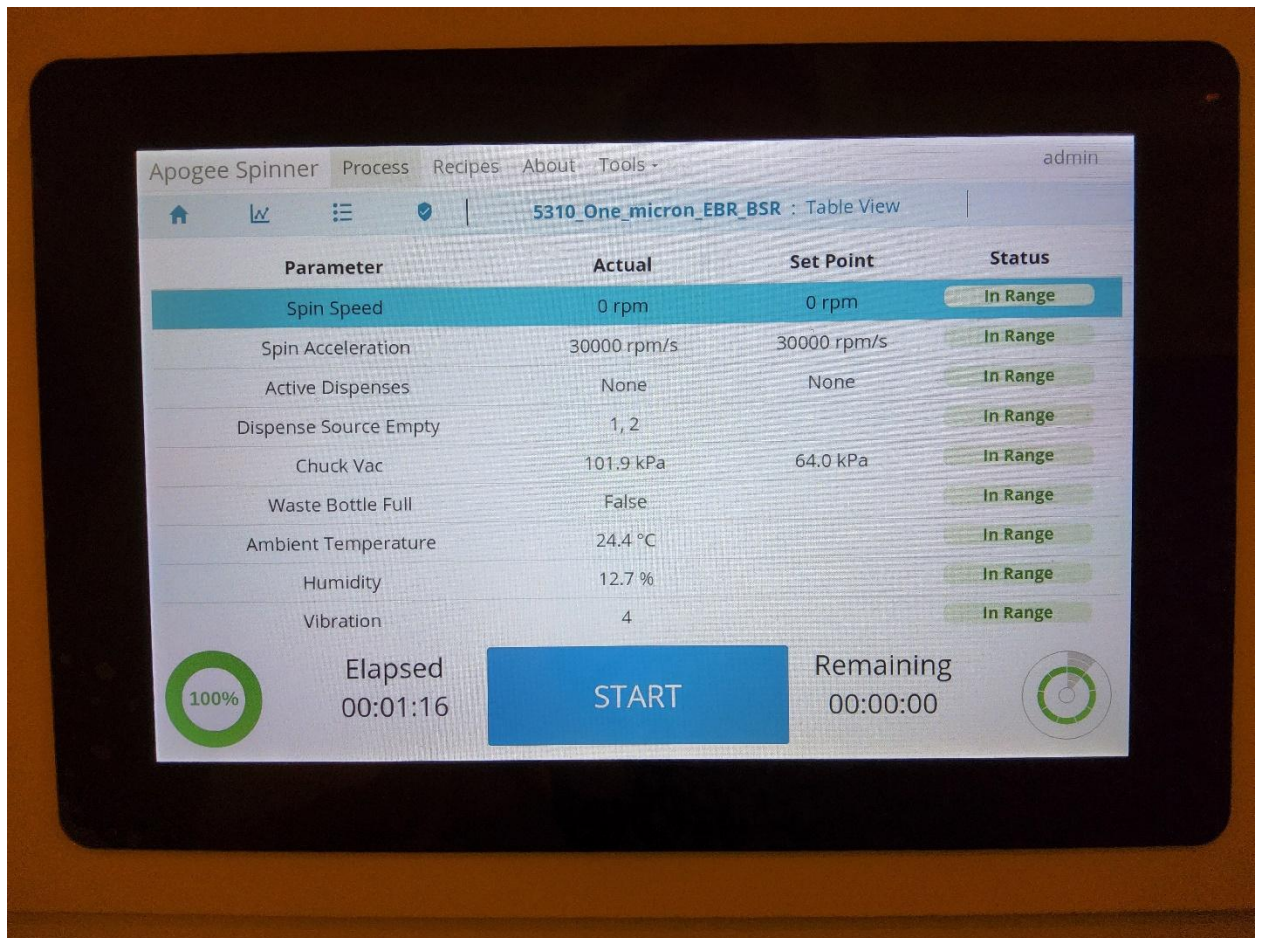


Figure 1.

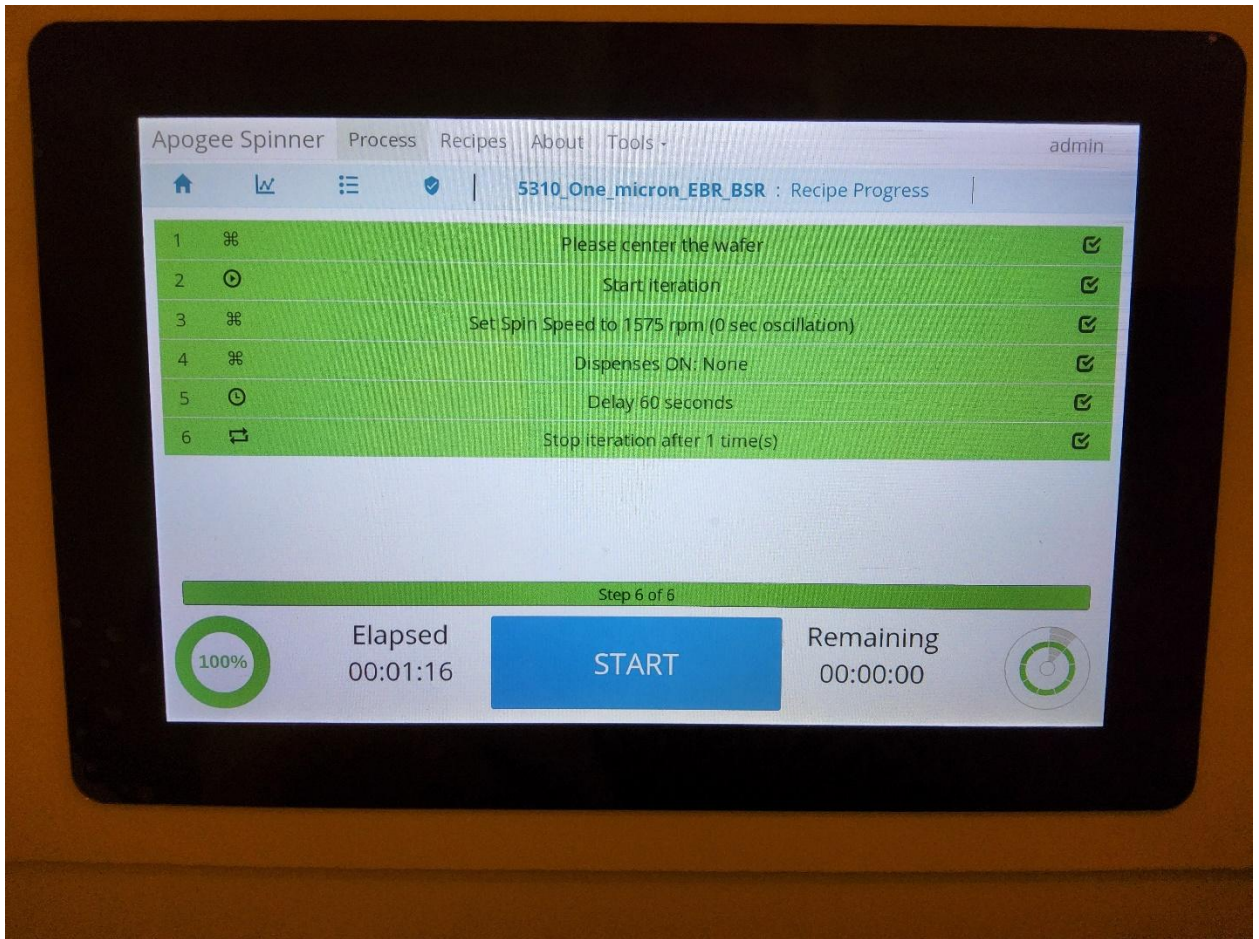


Figure 2

2. Load the desired recipe by selecting **Recipes=>Load=>recipe name=>Run**. The progress window will appear, and the recipe name will be displayed in the bar at the top of the screen.
3. Load the sample into the spin coat module.
4. Put the resist or primer you are using on the sample.
5. Close the lid and press **START**
6. A window will pop up that asks you to verify the sample is centered.
7. Press **START** again and the process will run to completion.
8. At completion, the beeper will sound. Press **OK** on the pop up that appears.

## 5.2. Bake Plate Operation

1. The Home screen of the Bake Module is shown in Figure 3. The operation of the software is similar to the spin module.

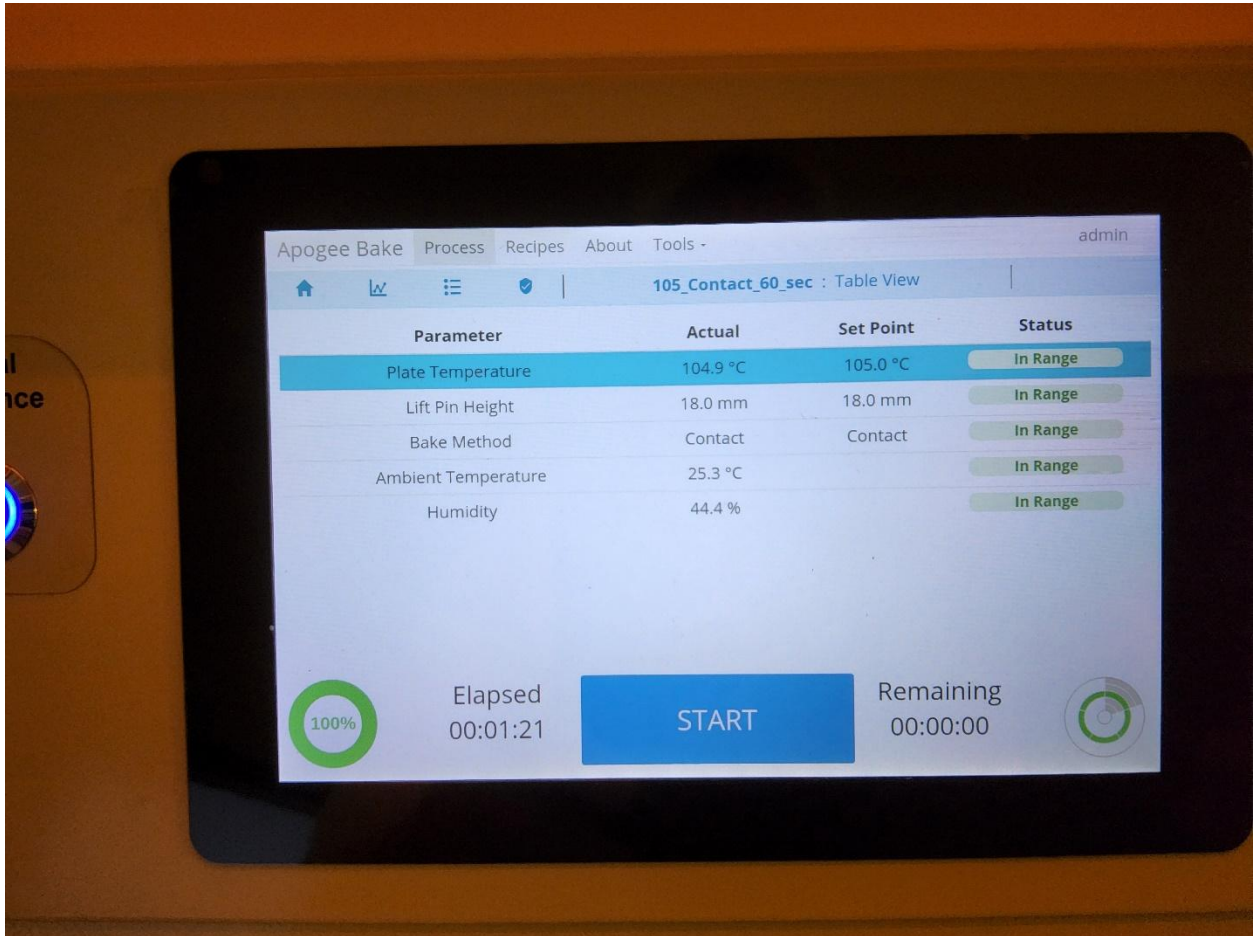


Figure 3.

2. Load the desired recipe by selecting **Recipes=>Load=>recipe name=>Run**. The progress window will appear, and the recipe name will be displayed in the bar at the top of the screen.
3. Lift the lid of the bake module and place your sample on the lift pins
4. Close the lid and press **START**
5. At completion, the beeper will sound. Press **OK** on the pop up that appears

## 5.3. Developer Operation

1. The Home screen of the Bake Module is shown in Figure 4. The operation of the software is identical to the spin module.

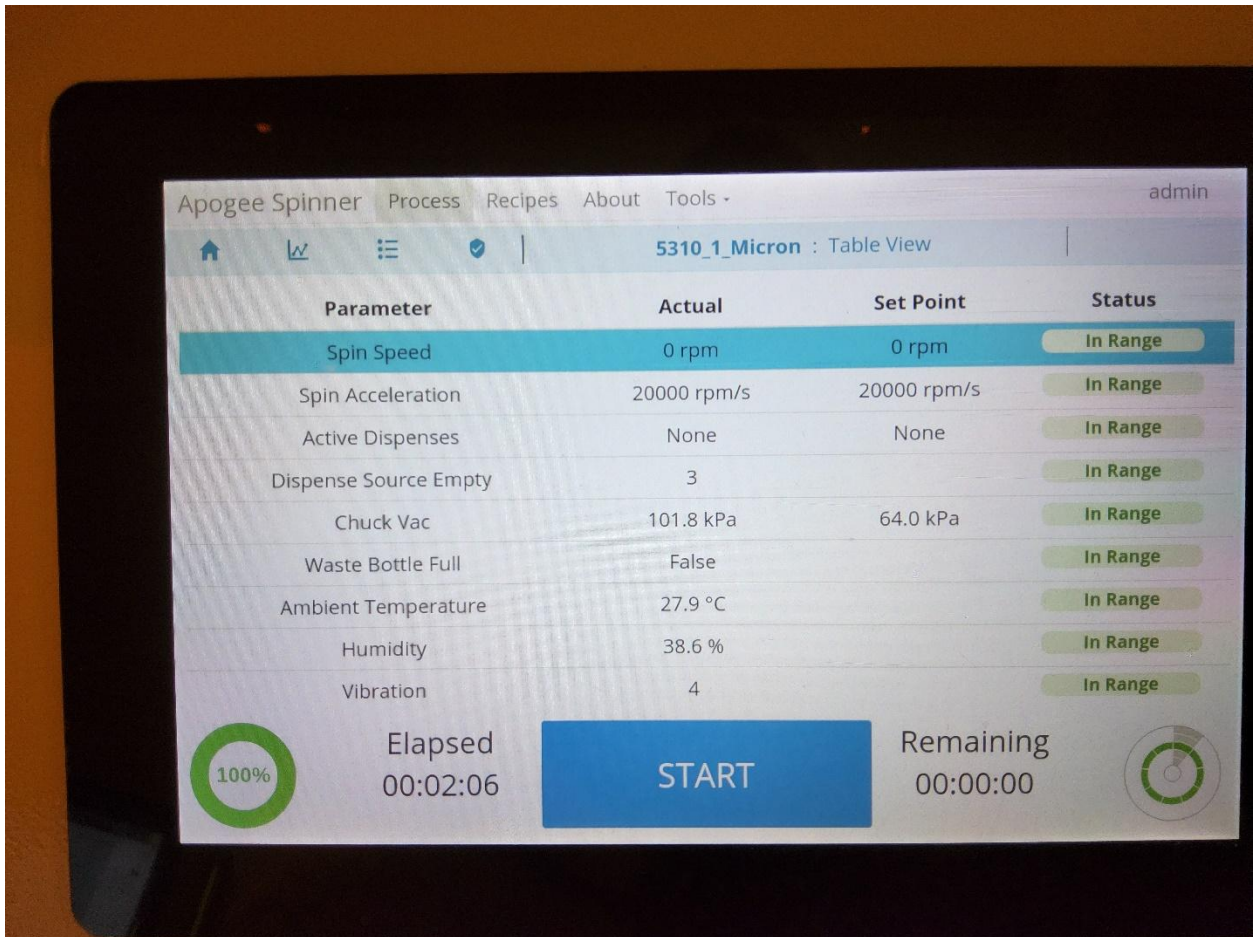


Figure 4

2. Load the desired recipe by selecting **Recipes=>Load=>recipe name=>Run**. The progress window will appear, and the recipe name will be displayed in the bar at the top of the screen
3. Load the sample into the develop module.
4. Close the lid and press **START**
5. A window will pop up that asks you to verify the sample is centered.
6. Press **START** again and the process will run to completion.
7. At completion, the beeper will sound. Press **OK** on the pop up that appears