3. Standard Operating Procedure

Resist spin coating and cleaning the backside of wafer

The substrate (wafer or piece part) needs to be clean prior to spinning resist. It is usually done with solvent cleaning (ACE/IPA), followed by dehydration. If the backside of the substrate has some resist residue or particulates, please make sure to clean it. This can cause errors in the interpreted best focus point since the wafer surface may be at a different height.

1. Make sure all work surfaces/spin chucks/hot plates are cleaned! Use clean steel surfaces for cooling down substrates after bakes
2. Spin coat resist following the recipe for spinning/baking specific resist
3. Check the backside of the substrate for resist residue/particulates before loading on the chuck
4. If you see particulates, try blowing off with N2 first, you may need a razor blade to remove stubborn particles
5. If you see on your 4inch wafer resist residue, do next:
    - Place the wafer upside down in the POLOS spinner using a non-contact chuck
    - Set spin speed to 2000 rpm
    - Spin wafer, wait until at top speed
    - Squirt Acetone on sample back for 3 seconds, followed by ISO for 3 sec
    - Spin Dry while blowing with N2
6. If your substrate is small piece, please clean the backside gently using the Q-tips
7. Load the substrate on the chuck and the on stage

Logging into computer and checking the system

The system administrator will set up a directory for you to LOG IN and use the stepper at the time of training.

1. At the colon log into the system using LOG IN [10,1]
2. Type MODE and scroll down through options
3. Select the chuck size. Use 100 for 4" substrates and 3 for 3" or smaller substrates. The number is used for telling the system where the chuck center is.
4. DO NOT change any other parameters in here, except the chuck size
5. Log out using LOG OUT
6. At the colon sign type LOG IN [10, xxx], and hit enter. (xxx-your account)
7. Type ORIG and hit enter. This resets the laser interferometer position measurement system and moves the stage through its entire motion

Reticle Loading and Unloading

The alignment of the reticle (mask) to the system is critical for achieving reproducible alignment. System alignment marks on the reticle are located near the right and left edges of the mask and are 103 mm apart, so they do not get exposed within the 100 mm exposure area of the mask. These marks are put on automatically by Photronix and the gds file can be obtained from Demis John if you use a different vendor. Use the following procedure to align the mask correctly to the system.

Important: If alignments are critical, do not just brush through this procedure. The global alignment requires good, precise alignment of the reticle with the system in order to work correctly. The local alignment system can adjust for local X and Y misalignment, but not rotational errors.

Loading the reticle:

Unlock spindle and swing lamp column to middle position so that the lens is exposed

1. Place mask chrome side down (brownish color), so that wording appears correct as seen in L-edit file
2. Swing lamp column so that objective can be used to align mask, DO NOT tighten spindle lock at this time
3. Using your hands and looking through microscope, shift and rotate mask so that the "crosses" are roughly aligned
4. Tighten spindle lock. This releases a vacuum holder onto the top of the mask so that the mask may be precisely aligned.
5. Looking through microscope piece, use alignment knobs (x, y) to translate and rotate(Θ) the mask into position. First focus the objective by using the knob on top of the microscope. Use the right alignment mark for the x-axis alignment and both alignment marks for the y-axis and rotation alignments.

NOTE: To get best and fastest results approach alignment from one direction, do not try to wiggle back and forth about the alignment position. Backlash in the mechanics can make this frustrating. You should see equal amounts of light in between all lines when the mask is aligned well (within 0.1 um).

6. Once mask is aligned, pull the reticle vacuum button to the left of the lens column. The reticle is now vacuumed to the system.
7. Use the stencil (usually L-shape mask cover), to cover part of the mask plate that you do NOT want to be exposed. If you have just one layer on your mask plate, you do not need to use the stencil. There are also blade apertures that could be used. The knobs on the lamp column (X, Y) can be adjusted to 100,75,50 and 25% to be open. Fully open blade apertures would be at 100%.
8. You are now ready to proceed with a focus job, map job, or exposure job

Unloading the reticle:

1. Unlock spindle and swing lamp column to middle position so that the lens is exposed.
2. Pull the reticle vacuum button to the left of the lens column. Unload the reticle from the system.
3. Swing the lamp column back, tighten spindle lock

Loading a wafer into the system

1. Attach the appropriate chuck to the system.
    - See the link GCA_6300_Chucks_table_2023
    - Make sure you know your substrate thickness and wafer diameter.
    - TARGET thickness is: 6.121mm +/- 0.1mm

    (TARGET= Chuck thickness+ Substrate thickness)
    - Each chuck has two numbers on top side (for example 76mm/635um) showing wafer diameter, and substrate thickness. See the link Available Chucks
    - If your sample is thin (150um thinner than the number on top side of chuck), then you need to use **SHIM** to add an extra thickness to your substrate (Shims with different thickness are stored in a drawer)
    - See this link for a detailed explanation of Substrate/Shim/Chuck Thickness
    - If you need a shim with different thickness, you can try cutting some shim stock (stored in drawer next to Autostep200).
2. Place your wafer centered on the chuck, noting the orientation. If you are doing an alignment step, make sure to place the wafer in the same orientation and as best as possible in the same location as the first exposure. The set screws in the chuck can help to get reproducible placement of the wafer. When the wafer is in place, flip the right vacuum switch upwards to hold the sample.
3. Place the sample chuck onto the stage, again trying to be repeatable, and flip the left vacuum switch upwards to hold the chuck.
4. Now you are ready to do an exposure job

https://wiki.nanofab.ucsb.edu/w/images/6/68/GCA_6300_Chucks_table_2023.pdf