

Plade Wet Bench: Lift-off Manual

Version of 2020-06-04.

1. Introduction

This user manual explains how to perform the lift-off process on a batch of wafers on the Plade “solvent” wet bench in Zone 01.

2. Login

- Login on the wet bench is done on the CAE control computer of Zone 1. It is only necessary at the end of the lift-off process for the DI water rinse step using the H₂O baths or the SRD tool.

Z01 Plade Solvent - Photolithography wet bench

3. Lift-off activation with US bath (optional)

- Load the wafers in one of the available cassette and put the handle. Leave some empty slots between each wafer for the metal membrane to detach and fall into the bath.



- Open the cover of the US bath and gently (to avoid metal agitation) plunge the cassette inside until it lands at the bottom.
- Start the ultrasonic agitation with the push-button on the front panel and let it run for 5 minutes.

Note: This step helps to create small holes in the metal membrane to speed up and facilitate the lift-off process but it is not always required

based on the pattern, deposition method and metal stack.

Note: US agitation may break fragile wafers/devices and it is not recommended in that case !

4. Lift-off in Remover 1165 baths

- After the US activation, transfer the cassette into one of the three Remover 1165 baths (PT1, PT3 & PT4). Proceed gently when going in and out of the bath but make sure the surface is not allowed to dry.
- Immersion time is process dependent and can vary greatly from a few minutes to several hours. Wafers are typically left overnight in the bath.
- If the tank needs to be used for a longer period, place label above tank with details on contact information, user name, start and end time.

Labels to be filled when leaving chemicals/equipment without operator

Username	
Lab	
Date / Time	
How to contact me Phone ... Office ... Mail ...	
Chemicals involved	
Equipment used	
Expected end/return	
Remarks	

- Users can regularly check the progress of the process by taking the cassette out an immediately back in.

5. Lift-off is not working ...

a. The metal has not peeled-off.

In some cases, the metal can still be attached at the edges of the wafer (for instance if an EBR was done). If this happens, users should try to detach the membrane with a tweezer and leave the cassette again in the bath for some time.

b. Some metal remain in certain areas of the wafer.

If this happens, it is possible to go back in the US bath to do an additional 5-10 minutes of ultrasonic agitation. This can generally clean the rest of the wafers.

c. The lift-off did not work at all!

If the process is not working at all, the reasons can be 1) the metal stack is too thick, 2) the deposition method is not optimal for lift-off, or 3) the resist was severely burned during metal deposition.

Check:

- The metal thickness should not be higher than 1/3 than the LOR 5A or nLOF 2020 resist thickness.
- For deposition, use thermal evaporation equipment (LAB 600, EVA 760) with a long working distance.
- For wafers with low thermal conductivity such as glass, use a cooling metal plate on the wafer backside during deposition.

d. Screw it! Should I give up and trash my wafer?

In the extreme case, if users are OK with slight surface damage or contamination, it is possible to mechanically remove the metal from the wafer by gently scratching with a cleanroom moisten tissue imbided with IPA.



- Then, wafers should be rinsed with water with the fast fill (FF) tank first, then the final rinse (TT) tank for at least 1 minute in each.
- The wafers may be dried with a nitrogen gun, or left on the sink for natural dry.
- Alternatively, the SRD unit can be used to dry the complete batch.
- Do not forget to logout from the wet bench on the CAE control computer of Zone 1.

6. Lift-off is completion

- Following the lift-off in remover 1165, immerse wafers in the IPA tank (PT2) for at least 1 minute to stop the process.