

## **Standard Operating Manual**

---

### **SCP Wet Station Z –Semi-clean Developing Station**

## Contents

1. Picture and Location
2. Process Capabilities
  - 2.1 Cleanliness Standard
  - 2.2 Substrate Size
3. Contact List and How to Become a Qualified User
  - 3.1 Contact person
  - 3.2 Training to Become a Qualified Wet Station User
4. Operating Procedures
  - 4.1 System Description
  - 4.2 Safety Warnings
  - 4.3 Operation Precautions and Rules
  - 4.4 Initial Status Checks
  - 4.5 Initial System Checks
  - 4.6 Personal Protective Equipment (PPE) Gowning Procedure
    - 4.6.1 Sequence for Donning PPE
    - 4.6.2 Sequence for Removing PPE
  - 4.7 Quick Dump Rinse Operation
  - 4.8 Aspirator Operation
  - 4.9 FHD-5 Positive Photoresist Developer Operation Procedure
  - 4.10 IPA/Acetone Waste Disposal Operation Procedure
  - 4.11 SU8 Developing with glove box operation procedure
  - 4.12 Clean Up
  - 4.13 Check Out

## SCP Wet Station Z –Semi-clean Developing Station

### 1. Picture and Location



This tool is located at NFF Room 2240 Cleanroom Class 100.

### 2. Process Capabilities

- 2.1 Cleanliness Standard: Semi-Clean, Non-Standard
- 2.2 Substrate Size: pieces, 2" or 4"

### 3. Contact List and How to Become a Qualified User

#### 3.1 Emergency Response and Communications

- Security Control Center: 2358-8999 (24hr) & 2358-6565 (24hr)
- Safety Officer: Mr. Wing Leong CHUNG 2358-7211 & 64406238
- Deputy Safety Officer: Mr. Man Wai LEE 2358-7900 & 9621-7708
- NFF Senior Technician: Mr. Henry YEUNG 2358-7896
- NFF Technician: Mr. Michael KWOK or Charles TANG 23587896

#### 3.2 Training to Become a Qualified User

## NANOSYSTEM FABRICATION FACILITY (NFF), HKUST

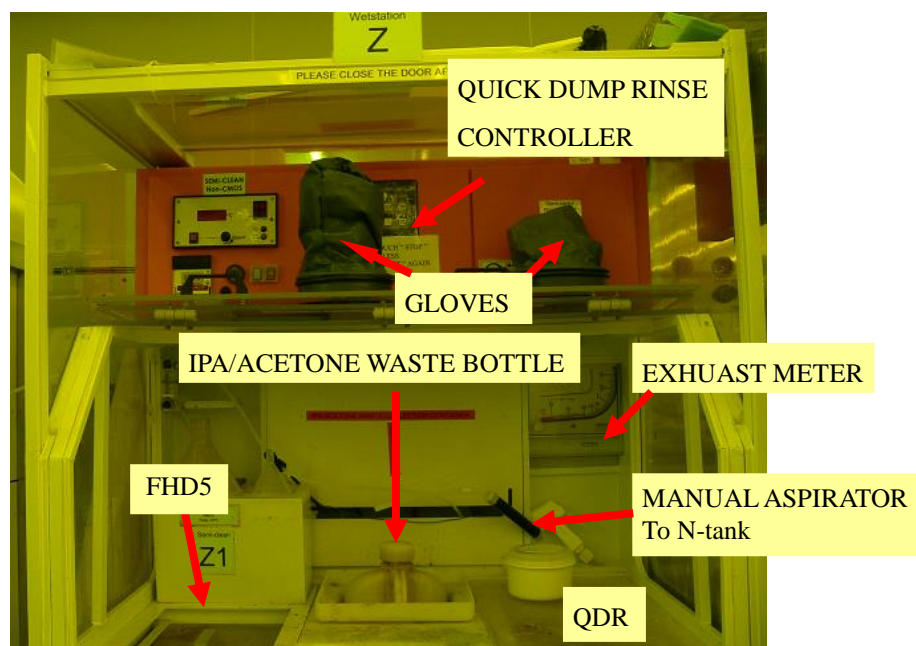
Please follow the procedure below to become a wet station qualified user.

1. Read through the on-line equipment operating manual of the equipment;  
<http://www.nff.ust.hk/equipment-and-process/equipment-operation-manual.html>
2. Attend the equipment hand-on operation training either by peer or NFF staff.
3. If training is provided by NFF staff, user must log in NFF equipment reservation system, and register these trainings.
4. Send an e-mail to Mr. Henry YEUNG requesting wet station qualified exam.
5. Pass the examination for the equipment operation and security.

## 4. Operating Procedures

### 4.1 System Description

The Wet Station Z is FHD-5 developing for semi-clean and non-standard wafer(s); SU8 developing for non-standard wafer(s) and dispose IPA/Acetone waste. This Wet Station provides one set Plastic Tank Z1: for semi-clean FHD-5 developing, one quick dump rinse bath (QDR), one IPA/Acetone waste bottle. This wet station integrates with Glove for SU8 developing.



Manual Aspirator Aspirates FHD-5 to Neutralization Tank

## NANOSYSTEM FABRICATION FACILITY (NFF), HKUST

There is one controller at this wet station. SCP Santa Clara Plastic 1100 Quick Dump Rinser is for Quick Dump Rinser (QDR).

### SCP Santa Clara Plastic 1100 Quick Dump Rinser



Cycle Count	Change the Rinse Cycle.
Door Open	Open the tank door to drain the D.I. Water.
Stop	Stop the process.
Start	Activate the dump Rinser.

#### 4.2 Safety Warnings

- 1 Follow NFF Health and Safety Manual.
- 2 The Emergency Off – Button (EMO Button) shuts down the machine immediately. Only use the EMO in emergency situations. Emergency situations are where injury of personnel or serious damages of the system impends immediately.
- 3 According to the general fire emergency procedure of HKUST, please report the accident to the Security Control Center first. The nature of other emergencies will determine whether you will call police, staff, or both. If someone is injured, the 9-999 emergency number should be called before calling staff. If there is a facilities problem, such as a flood or a utility problem that does not present a danger to lab users but may result in damage to equipment, the staff or EMO need to be called. The 9-999 emergency should not be called for facility or equipment problem.

## NANOSYSTEM FABRICATION FACILITY (NFF), HKUST

Always call 9-999 when a potentially life threatening situation might exist (injury, fire, gas leak, etc.)

- 4 When working at the wet station, always use appropriate personal protective equipment (PPE) – apron, face shield, chemical resisted gloves. After complete the process, rinse off gloves at the rinse bath, dry with wiper and put it back.
- 5 Even you wearing PPE, never put your hands or fingers into a chemical bath.
- 6 Do not walk away from wet station while wearing PPE. If you need to step away from the wet station at any time, rinse off gloves at the rinse bath, dry with wiper and put it back.
- 7 Never touch any surface while wearing chemical-resisted gloves that other lab members may come into contact with, such as table tops, door handles, phone, computer keyboards, face shield, apron, etc. Gloves shall be removed before touching other surfaces.
- 8 All spills on the wet bench during process should be cleaned up immediately.
- 9 Check the leakage of chemical-resisted gloves by N2 Gun every time.
- 10 Tanks are breakable, carefully place wafers in them, never bang a cassette on the side.
- 11 During process, don't remove cassette handler from cassette.
- 12 Never operate the heated tanks without the proper fluid level.
- 13 Read and understand the MSDS for the chemical being used.
- 14 Know the location of the nearest safety shower and eyewash station.
- 15 Make sure the wet station having sufficient exhaust.
- 16 Improper disposal of waste could result in explosion and injury. Take time to consider how to dispose in your process or contact NFF staff.
- 17 No acid allowed at this wet station.
- 18 Don't dispose hot chemicals. The temperature should be below 30°C before disposing.
- 19 If the machine failure while being used, never try to fix the problem by yourself. Please contact NFF staff.
- 20 When Neutralization system has the problem, the buzzer (there is one over between Wet Station D and E) will sound. If this happens, none of the wet station may be used.

### 4.3 Operation Precautions and Rules

1. Do not operate the machine unless you are properly trained and approved by NFF staff.
2. All wet-processing baths are designed and arranged according to their cleanliness levels and purpose; users are not allowed to use those solutions for different purpose.
3. The Teflon cassette, cassette handle, 2” dipper basket with green button label is allowed for FHD 5 develop, the green and black button label is allowed for QDR in this wet station.
4. All container and mask handle should be reserved in the yellow room container booking system. Cleaning and drying the container and mask handle after you have finished using it, check out and return it back to original location.
5. Do not store wafer(s) in Yellow room Wet station cassette. To store wafer(s) in your own plastic cassettes and boxes.
6. Always inspect your wafer(s) after a resist strip to ensure cleanliness.
7. Liftoff processes are not allowed at this bath.
8. After prepare the solvent in a container, please always cover and label the container. Dispose acetone or IPA to acetone or IPA waste collector in the Wet Station Z, manual aspirate FHD-5 and AZ400K developer to Neutralization tank if you are not using it.
9. Don't leave any unnecessary things on the wet station.
10. If a wafer falls out or breaks, do not attempt to retrieve it. Contact NFF staff.
11. Close the cover after each use.
12. Process Temperatures are set and should not be changed without NFF Staff approval.
13. Blow drying the mask immediately after cleaning to avoid water marks.
14. Please fill all the details of the log sheet attached.

### 4.4 Initial Status Checks

- 1 Please check the status of shutdown notice posted in the NFF reservation website
- 2 Before operate the machine, please make sure you have read check list and fill

the log sheet.

#### **4.5 Initial System Checks**

Before starting, verify the machine is in the correct idle state:

1. If system power is off, notify NFF staff to turn on power switch on the controller. Leave system ON, after your process.
2. Check the IPA/Acetone Waste bottle is not full; replace an empty waste bottle which is in the yellow chemical cabinet next to Freezer.
3. Verify that the FHD-5 you want to use is filled to the proper level.
4. Verify that the wet station has DI wafer, Nitrogen.
5. Verify that the exhaust level is normal.
6. Check log book that last user had no problem.

#### **4.6 Personal Protective Equipment (PPE)**

Users are required to use additional Personal Protective Equipment (PPE) when working in the wet station.

##### **4.6.1 Sequence for Wearing PPE**

PPE consists of three items that should be worn in the following order: an apron, a face shield, and chemical resisted gloves. Check all items for damage before each use, inspect the apron and face shield for damage (e.g. cracks, scratches). Gloves are to be inspected for damage and contamination. Use Nitrogen Spray Gun injects the Nitrogen to the chemical resisted glove and immerse to the DI water Bath for leakage check. Face Shield places over face and eyes, and then adjust to fit.

##### **4.6.2 Sequence for Removing PPE**

PPE should be removed in the following order: chemical resisted gloves, a face shield and an apron. Rinse and dry the chemical resisted gloves, remove them and hang them up. Hang face shields and avoid damage it. Lastly remove the apron and be careful to hang it. If apron has any liquid, use a wipe to dry it. Do not leave inside out.





#### 4.7 Quick Dump Rinse Operation

The purpose of QDR is to rapidly wash surface of the wafer and leave the wafer in a clean condition.

1. Place the wafer in the quick dump rinse (QDR) bath, initially should be full of DI water and close the lid.
2. Press the **START** button of UFT 48-8 quick dump rinser controller to activate the QDR. It will cycle down from 4 to 0 in the display window.
3. After completion of the cycle the warning sound will be audible until the **RESET** button are pressed.
4. Press **RESET** button to automatically reset itself in preparation for another run.
5. Press **HOLD** button to manually dump or fill the bath.

#### 4.8 Aspirator Operation

1. The aspirator can be activated by pressing the **ASPIRATOR** button located on the control panel of the wet station. The aspirator timer is set by default to thirty seconds.
2. Use the aspirator to dispose the water-soluble alkali to Neutralization Tank.

#### 4.9 FHD-5 Positive Photoresist Developer Operation Procedure

FHD-5 Developer is used to dissolve UV exposed area of positive photoresist. This bath is for semi-clean wafer(s).



1. Wear Personal Protective Equipment (PPE) following the section 4.6.1
2. Place the wafer to designated Teflon Cassette or 2" dipper Basket. Use designated Teflon Cassette handles to attach to the notches on both end walls of Teflon cassette. Both of them are marked with green label.
3. Place wafer in the FHD-5 bath. Make sure that the wafer(s) are completely covered by the solvent. Press Stop Watch to start to count process time.
4. The process time normally is 1-2 min(s) at room temperature.
5. When the developing is completely, transfer wafer(s) to QDR bath to rinse the wafer(s) with DI Water.
6. Place the cassette in the quick dump rinse bath to start the DI rinse 4 cycles following the section 4.7.
7. Take off PPE, chemical-resisted gloves, face shield and then apron.
8. Remove Cassette Handle and load cassette with wafer(s) into Spin Rinser Dryer SRD for final rinse and dry cycle (Refer to SRD operation Manual).
9. You can use Nitrogen Gun to drying your pieces, 2" or 4" wafer(s).
10. Use oven to hard bake your wafer(s) to enhance physical adhesion and chemical resistant.

#### **4.10 IPA/Acetone Waste Disposal Operation Procedure**

1. If no waste bottle available or the bottle is full, replace it with an empty waste bottle which is stored in the yellow chemical cabinet next to Freezer.
2. Place the funnel into the bottle.
3. Slowly pour the waste IPA/Acetone to the waste bottle. Never over fill the waste bottle.
4. Rinse the container, funnel with QDR to dump rinser 4 cycles, following the

section 4.7.

5. Use N2 gun or clean room wipe to dry the container and funnel.
6. Place container and funnel back to original location and check out at the container booking system.

#### **4.11 SU8 Developing with glove box operation procedure**

The glove box is used for SU8 Developing, in order to prevent the odor escape into the lab during SU8 Developing, all SU8 users should develop in this glove box of wet station.

1. Put all necessary chemicals (i.e SU8 developer, IPA) and lab ware (i.e container, cassette) to the wet station.
2. Close the cover.
3. Use Gloves to handle for the whole process of SU8 Developing.
4. Dispose SU8 waste to SU8 waste bottle and rinse container or wafer(s) in the Quick Dump Rinser.
5. Place all chemical back to original location.
6. Clean and dry all the lab ware and container, and place them back to original location also.
7. Check out the container in the NFF yellow room container reservation system.

#### **4.12 Clean Up**

1. Clean up the working area of wet station after using because the chemicals may spill out during your process.
2. Wash and dry all the container, and then return them to original location.
3. Leave the Quick Dump Rinser filled with D.I. Water and the lids closed.
4. Close Wet Station Cover.
5. Fill out the log sheet.

#### **4.13 Check Out**

Check out the container in the NFF yellow room container reservation system immediately after use.