



Lab Manual

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Chapter 10.02

CMP Cleaning

(sinkcmp - 190 Cory)

1.0 Title

Post CMP clean sink (sinkcmp)

2.0 Purpose

Methods to clean CMP polished wafers are provided in this chapter manual.

3.0 Scope

This document describes the PVA sponge clean, megasonic bath clean, water rinse in QDR, spin dry on Laurell spin dryer and piranha clean options to clean the wafers after CMP polish.

4.0 Applicable Documents

[Revision History](#)

There are softcopy and hardcopy manuals for the megasonic bath and the spin dryer available upon request in the Microlab office.

4.1 The PCT Systems, Inc. Series 6000 Hyper Clean Megasonic System User Manual.

4.2 The Laurell WS-400 series Controller Operation Manual.

4.3 Refer to Chapter 2.9 for QDR operation.

5.0 Definitions & Process Terminology

Wang A. or SC1 – Hydrogen peroxide, ammonium hydroxide and water mixture is a popular cleaning solution.

6.0 Safety

Put on chemical gloves, face shield and apron when mixing chemicals and cleaning wafers in megasonic chemical bath.

7.0 Statistical/Process Data

N/A

8.0 Available Processes, Gases, & Process Notes

8.1 Available Processes

8.1.1 Process # 01 cleaning in the megasonic bath with D. I. water or SC1 after CMP polish is one option.

8.1.2 Program **A** on the Laurell spindryer spins dry individual wafer at 3000 R.P.M. for 30 sec.

8.2 Process Notes

8.2.1 Always keep wafer wet after CMP polish. When slurry is dry on wafer, it is almost impossible to remove.

- 8.2.2 One of the SC1 mixture ratio is 10 ml hydrogen peroxide, 10 ml ammonium hydroxide & 1000 ml H₂O and the PH = 10.
- 8.2.3 A force of attraction holds particles on substrates. The natural force favors the adhesion of the water molecule over particles. This reduces particle adhesion and inhibits depositing particles again. However, the air gap interferes with the wetting action and reduces particle wetting. Cleaning with SC1 on bare silicon wafer will form an oxide layer to reduce the hydrophobic qualities of the substrate and allow the particles above 1 micron to wet efficiently. Increase frequency in megasonic cleaning improves wetting efficiency and helps removing small particles.

9.0 Operating Procedure

- 9.1 Enable sinkcmp on the Wand.
- 9.2 Remove the wafer from the wafer chuck after CMP polished.
- 9.3 Pick up the wafer with a pair of tweezers and rinse well with the water deck hose for 10 seconds.
- 9.4 Take wafer to the post CMP sink and lay the wafer on a clean texwipe.
- 9.5 Press one edge of the wafer with a pair of Teflon tweezers.
- 9.6 Apply directional cleaning strokes with a wet PVA sponge for 15 seconds.
- Note:** This PVA sponge must kept clean and wet in the designated container on the sink top.
- 9.7 Rotate wafer 90°, rinse PVA sponge with D. I. water and repeat the directional cleaning strokes for 15 seconds.
- 9.8 Put wafer in wafer cassette and attach the cassette handle on.
- 9.9 Put cassette with wafer in the water filled QDR tank immediately afterward.
- 9.10 Rinse wafer for 2 cycles.

Post CMP cleaning can be chosen individually afterward as an option shown below:

9.11 **Option A – Spin dry**

- 9.11.1 Use N₂ gun to blow dry a 2" diameter on the center of the backside of the wafer.
- 9.11.2 Lift opens the Laurell spin dryer lid.
- 9.11.3 Place wafer on the center of the wafer chuck.
- 9.11.4 Close the lid.
- 9.11.5 Press **Program Select** button until **Program A** is display on the right top corner of the read out.
- 9.11.6 Press the **Vacuum** button to activate the vacuum.
- Note:** Vacuum reading below 20 IOM indicates marginal vacuum. 15 IOM vacuum is normally required to operate.
- 9.11.7 Press the **Run** button to spin dry the wafer. Press **STOP** if want to abort the spin dry process.
- 9.11.8 After it is finish, press the **Vacuum** button to deactivate the vacuum.
- 9.11.9 Open the lid and remove the wafer.

9.12 **Option B – Megasonic clean**

- 9.12.1 Flip the **EMPTY** toggle switch to **OPEN** to drain the solution in the megasonic bath.
- 9.12.2 Clean the tank with D. I. H₂O.

- 9.12.3 Flip the **EMPTY** toggle switch back to **CLOSE**.
- 9.12.4 Flip the **FILL** toggle switch to **OPEN** to fill the tank with D. I. H₂O or mix SC1 cleaning solution as appendix A for the megasonic bath.
- 9.12.5 When the LCD panel displays **Hyper-Clean ready to run Process # 01**, put cassette with wafer in megasonic bath with D. I. H₂O or SC1. (Note: If display is not in ready to run mode, press F2 key, PROG key & enter 01 or ALT key until the correct message display is on.)
- 9.12.6 Press green **START** button on the sinkcmp control panel. Megasonic clean will start a 10 minute cleaning cycle and at 100% power.
- 9.12.7 When process is finish, a message will display **HYPER CLEAN PROCESS COMPLETE, WAFERS ARE CLEAN, PRESS STOP TO STOP ALARM**. Press the red **STOP** button on the sinkcmp control panel.
- 9.12.8 Pull the cassette of wafer out. Place it in the QDR tank and rinse it for 2 cycles.
- 9.12.9 Spin dry as the instruction on option A or piranha clean as option C.

9.13 Option C – Piranha clean

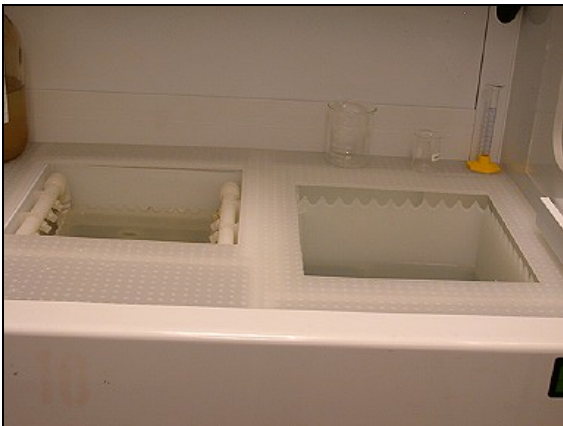
- 9.13.1 Prepare a container with enough water to cover the wafer.
Note: Prepare ahead of time so the slurry on the wafer will not get dry on the wafer.
- 9.13.2 Clean the wafer as [steps 9.2](#) to 9.7 or [9.11](#).
- 9.13.3 Put wafer in the water container and bring it up to the Microlab.
- 9.13.4 Clean the wafer with the standard piranha cleaning procedure in sink8.
Note: Refer to [Chapter 2.8](#) for details.

10.0 Troubleshooting Guidelines

10.1 Alarm is sounding

- 10.1.1 Press STOP button to silence alarm on the megasonic bath.
- 10.1.2 Press RESET button to silence alarm for QDR bath.
- 10.1.3 Press big red emergency button to silence alarm for the sink.

11.0 Figures & Schematics



QDR Tank and Megasonic Bath



PVA Sponge in Water Container



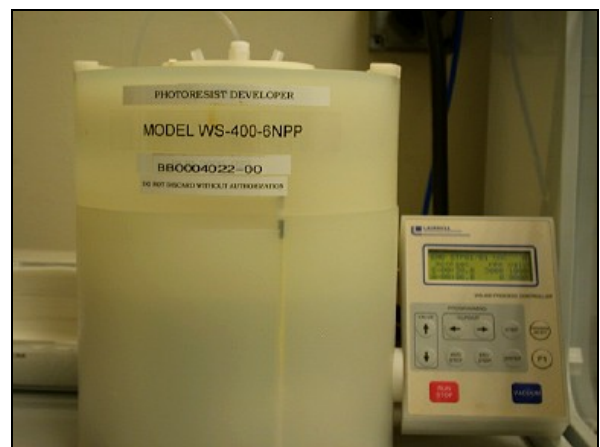
Emergency Stop and QDR Control



Megasonic Bath Fill and Drain



Megasonic Bath Control



Spin Dryer

12.0 Appendix

12.1 Mix SC1 solution to cover 6" cassette in megasonic bath:

12.1.1 Put on safety attire.

12.1.2 Add 15,000 ml D. I. H₂O in the clean megasonic tank with the **FILL** and **EMPTY** toggle switches close.

12.1.3 Add 150 ml hydrogen peroxide.

12.1.4 Add 150 ml ammonium hydroxide.

12.1.5 Stir mixture with empty Teflon cassette and handle attached.