Chapter 2.3

Msink3 - Manual Spin Coat & Develop Sink

(msink3 - 382)

1.0 Title
Msink3 – Manual Spin Coat & Develop Sink

2.0 Purpose
This is a general use photolithography sink equipped with a manual spin coater located in the 382 Bay of the Marvell Nanofabrication Laboratory. Top schematic view shown in Figure 1.

3.0 Scope
This manual covers the general operation at msink3 and the embedded manual spin coater machine has its own equipment manual (spinner). The sink consists of a drain tank, a container for small photoresist waste bottle disposal, a goose neck and aspirator, deck hose and nitrogen gun, a chlorobenzene dispenser, acetone wash bottle, methanol wash bottle, IPA wash bottle and a general sink top area for developing and hardbaking substrates. An organic waste bottle for photoresist and acetone, as well as chlorobenzene is recessed at the right rear of the sink.

4.0 Applicable Documents
Revision History
Chapter 1.7 - Material and Process Compatibility Policy
Chapter 4.30 - Headway Manual Load Photoresist Spinner at msink3

5.0 Definitions & Process Terminology
5.1 Exhaust Alarm: This alarm shuts off the power to the sink, when sink exhaust level falls below a certain limit (currently set at 0.8 inches of water, full scale is 1).
5.2 Polymide: A spin-on organic insulator which is typically used as an interlayer dielectric.
5.3 DI: De-ionized (DI) water used for clean processes with resistivity of ~18 MOhm-cm.
5.4 HMDS: Hexamethyldisilazane is widely used in the semiconductor industry to improve photoresist adhesion to oxide by reacting with the surface in a process known as silylation, forming a strong bond to the surface.

6.0 Safety
Follow general safety guidelines for the lab; the safety rules outlined in Chemical Hygiene Chapter 1.01 and the following:

6.1 Make sure the spinner lid is closed and wafer is secure on the spin chuck (vacuumed down), before attempting to run the spinner. Do not touch any moving parts.

6.2 EPO red button: Cuts power to the sink in emergencies. Report promptly on FAULTS.

6.3 De-ionized (DI) water deck hose for the sinks is ALWAYS available for emergencies; it provides a good safety backup in the event of exposure to chemicals.

6.4 Hot plates are not allowed at this sink. Msink16 and msink18 are more suited for general purpose wet chemical sinks equipped with hotplates in 582A, for non-lithography related applications. Please note that there are many stand-alone ovens and hot plates available at this bay for resist-baking and curing.
6.5 **Msink3** has an integrated fire suppression system which is tied to the lab and building-wide fire alarm system. Activation of the fire suppression system releases large volumes of CO2 directly at the heated baths and deck area of the sink. Activation of the fire suppression system will also initiate the lab and building-wide fire alarm. Immediately, evacuate the lab after activation of msink3 integrated fire suppression system.

7.0 **Statistical/process data**

N/A

8.0 **Available Processes**

**WARNING**: The use of acids, acid etchants and plating baths is strictly prohibited for Nanolab sinks fabricated of stainless steel. Some acids and ferrous metals are incompatible resulting in corrosion and rusting of the metal surfaces. Acid use and plating is restricted to Nanolab sinks made of chemically-resistant, fire retardant, white polypropylene.

Manual coat and development of variety of photoresists, Polyimide, Spin on glass and other material that need to get coated on different size substrates. Refer to spinner operation Chapter 4.30 for spin coating material/s on the manual coater.

9.0 **Sink Operation**

9.1 **Control Panel**

The buttons along the front panel of this sink are used to control the EPO, power on, power off, alarm silence and alarm reset functions of the sink (see Figure 3). The following describes their use.

9.1.1 Press PUMP OFF/ON button to enable/disable aspirator operation. The container or beaker which holds etchant or solvent is drained by using the aspirator in combination with the plenum flush. By pressing the button, turn the aspirator on to activate the plenum. This turns off automatically after a 15 second period. Before aspirating any solution, rinse off the aspirator tip with the deck hose to avoid contamination. Water-soluble solvents such as acetone, methanol and isopropanol can be aspirated. Collect non-water soluble solvents such as photoresist and chlorobenzene in the waste disposal bottle at the right side of the sink.

9.1.2 GOOSE NECK OFF/ON: press to enable water flowing through the goose neck into the rinse tank. Water flow will shut off automatically after 15 seconds. Flow strength can be adjusted by turning the valve on the side of the goose neck.

9.1.3 SILENCE: press the orange "silence alarm" button on the front panel to silence an alarm.

9.2 **Msink3 Operation**

Msink3 is the general use photolithography sink. Underneath this sink are chemical storage drawers primarily for developers. Check this drawer first for an opened chemical bottle before bringing another one into the NanoLab. Neither these drawers nor the surrounding floor area by this sink are meant for storage of empty bottles. All empty chemical bottles MUST be taken to bottle washer station in 582A, and properly rinsed, then scratch labels dispose in proper bins.

No chemistry or heating of solvents or other chemicals are allowed at this sink. Use msink16 and msink18 instead.

9.3 **Spinner Operation**

Please refer to spinner manual Chapter 4.30 for operating instructions on the Headway Spinner.
**10.0 Troubleshooting**

10.1 Power to system is off: Press power ON if no issues have been reported on the Mercury or if the system is not under technician's control.

10.2 If the sink does not power up, then check Photohelic Differential Pressure reading (Figure 2) and makes sure it is within acceptable range (between the two red bars): Consult with staff to check house exhaust pressure, if it is outside the limits set by the two red bars.

**11.0 Figures & Schematics**

![Figure 1 - Msink3 Top Layout Schematic](image1)

![Figure 2 - Photohelic Gauge](image2)
Figure 3 - MPC-901 Emergency Off Alarm Controller