1.0 Title
Msink16

2.0 Purpose
Msink16 is a general-purpose wet chemical sink located in Room 582A (Polishing/Wet lab) at Marvell Nanofabrication Laboratory. This sink is considered a metal-contaminated sink. Once wafers or materials are processed at msink16, they may not continue processing at msink1, msink6, msink7 or msink8.

3.0 Scope
This manual covers information about the msink16 layout, chemical cabinets that support this sink, as well as other pertinent information on this sink. This sink is equipped with a large work surface deck area, a utility sink and one chemical waste bottles at each end of the sink (Figure 1).

4.0 Applicable Documents
Revision History
Chapter 2.1 – Cleaning procedures and bottle washer (bottlewash) operation
Spray Gun Manual for Enhanced Liftoff

5.0 Definitions & Process Terminology
5.1 Gloves Wash – Automatically wash the chemical gloves when you put your hands in.
5.2 Exhaust Alarm – This alarm shuts off the power to the sink when sink exhaust level falls outside the allotted exhaust band.
5.3 Dwyer Photohelic Exhaust Flow Meter: Monitors the sink exhaust level and will shut down all electricity and water to the sink, if there is too much or too little exhaust flow.
5.4 MPC-901 Emergency Red Button: Cuts power to the sink in case of emergencies. Push the big red EPO button to cut the power to this sink. Report promptly on FAULTS.

6.0 Safety
6.1 Follow all the safety rules applicable to working with acids and bases.
6.2 Face shields, surgical gloves covered by chemical-resistant gloves and aprons must be worn at all times when working with chemicals at this sink.
6.3 Do not mix solvents with acids, which is potentially an explosive combination. This is also true when aspirating chemicals at this station.
6.4 Use the aspirators to dispose of water-miscible, acids, bases, and solvents.
6.5 Use the chemical waste bottles to dispose of used PRS3000, lift off by-products, acetone and photoresist.
6.6 Do not place flammable solvents (container) directly onto the hot plate at this sink, i.e. PRS-3000 resist strippers with the flash point of 93°C (199°F) can easily catch on fire. Refer to PRS-3000 Material Data sheet in the blue binders (gowning area) for more information.

6.7 Do not stock or store chemicals in the chemical cabinets that are not listed on the inventory list and posted on the front door of each cabinets located in the chase area, south side of 582A.

6.8 There is an emergency safety shower/eyewash station at the eastside of 582A room (polisher/wet lab area); to activate the shower, pull down on the shower ring; to activate the eyewash, press on the paddle.

6.9 Never touch any surface/s while wearing chemical-resistant gloves, such as table tops, door handles, computer keyboards, face shields, aprons, etc. Your gloves may have acid residues on them, hence presenting hazard to other members that may come into contact with such surfaces/items in the lab. If you need to step away from the sink at anytime, rinse off your chemical resistance gloves with the DI deck hose, dry with techni-cloths and put them away in your drawer until you are ready to resume your work at the sink.

6.10 Hot plates may be left unattended when performing well understood, stable processes, during regular MNL Staff hours (8AM – 5PM) if labeled with a blue process identification tag. Hotplates should be periodically monitored. Hot plates must be secured before finishing laboratory activities for the day. In the event a process requires hotplate use outside of regular Staff hours, members are responsible for conducting routine inspections that maintain a safe, well controlled process. Any hotplate above 200 °C requires full supervision until processing is done.

7.0 **Statistical Process Data**

N/A

8.0 **Available Chemicals**

8.1 The chemicals used at msink16 are stored in metal cabinets located in the chase south side of 528A, as well as the storage bins under the sink (immediate use). There are three cabinets in this chase: acids, bases (bases, developers, photoresist strippers), and electroplating and solvent cabinets. There is also a chemical cabinet available in this room for disposal of chemicals that can not be aspirated, serving the entire lab. This cabinet gets checked and, if necessary, purged by staff on a weekly basis.

8.2 Acid cabinet in blue color is designated for acids only. The top shelf holds Chromium Photomask Etchant, Buffered Oxide Etch 5:1, Buffered Oxide Etch 10:1, Hydrofluoric Acid 49%, and Sulphuric acid. The bottom shelf holds Phosphoric acid, Nitric acid, Hydrochloric acid, Aluminum Etchant, Pad Etch, and Acetic acid.

8.3 Base cabinet in yellow color is designated for bases, developers, and photoresist strippers. The top shelf of this cabinet hosts personal use chemicals (bases); any chemicals stored on this shelf must have the **approved special chemical** label on it (obtained from the Microlab office), plus your name and date. The middle shelf holds buffer solutions, preferential Silicon Etchant, and Ammonium Fluoride. The bottom shelf holds acetone, MP Developer, and PRS-3000 Photoresist Stripper.

As with other cabinets, to conserve space, please do not store an unopened duplicate bottle, until the one already in place has been emptied (general Marvell Nanolab policy).

8.4 Tall plating and solvents cabinet in yellow color is designated for plating type chemicals and solvents, as well as some miscellaneous chemicals storage. Needless to say that the miscellaneous chemical stored in this cabinet need to also be chemically compatible to prevent fire or explosion hazards. Consult with staff (Bob Hamilton), if there are any questions on chemical compatibility.

8.5 The short yellow cabinet is designated for **Chemicals for Disposal**. Chemical waste should be logged on the manifest log sheet, and tagged with ID stickers (chemical waste ID stickers can be
found on the top of this cabinet) and must be filled out with the date and proper chemical information. Notify staff if the cabinet is full.

Note: No untagged waste bottle are allowed to be placed in this cabinet

9.0 Equipment Operation
A hot plate is available on the deck of msink16. Be sure not to place flammable solvents directly onto the hot plate for safety reasons. This sink is also equipped with two DI deck hoses, one on each side of the sink, and nitrogen guns next to these deck hoses. There is an aspirators available in the mid-section of the sink by its back wall.

9.1 Aspirator Operation
9.1.1 The aspirator can be activated by pressing the ASPIRATOR button located on the front panel of the sink. The aspirator timer is set by default to three minutes.
9.1.2 Use the aspirators to dispose of water-miscible acids and solvents. Be careful not to mix solvents with acids when aspirating this is a potentially explosive combination.

9.2 Deck Hose and Gooseneck Instructions
9.2.1 The de-ionized (DI) water deck hoses for the sinks are always available for emergencies; it provides a good safety backup in the event of exposure to chemicals.
9.2.2 To enable water flow to the gooseneck, press the GOOSENECK button on front of the panel. Water flow will shut of automatically after 3 minutes.

9.3 Chemicals
9.3.1 The chemicals used at msink16 are stored in the metal cabinets in the chase south side of the room 528A and are described in detail in the preceding Section 8.0.
9.3.2 For obvious safety reasons and chemical management purposes, do not store any chemicals in these cabinets that are not already inventoried and listed on the front of these cabinets.

9.4 Heating Solvents
9.4.1 Solvents must be heated in a water jacket and not directly on the hot plate. Place your solvent container in one of the designated trays available at the sink with water inside the tray. See Figure 4 for more detail.
9.4.2 Do not leave solvents unattended in these trays and/or for too long as water could evaporate and solvent will essentially come into direct contact with the hot plate, consequently rise above its flash point and catch fire.
9.4.3 PRS-3000 is available in heated baths at Msink2 for batch PR stripping. This sink is considered metal contaminated and is compatible with Msink16 and Msink18 (gold and other metal are allowed in Msink2). This obviates the need for setting up large heated PRS3000 containers at general purpose Msinks16 & Msink18.

9.5 Cleanup Procedure and Empty Bottle Disposal
9.5.1 Whenever you have emptied a chemical bottle, either plastic or glass, make sure to use a safety carrier to transport it to the bottlewash station next to msink16 to rinse it thoroughly, wipe it dry, scratch the label (X-ed out), then dispose the bottle in the appropriate disposal can in the same room 582A. Refer to Chapter 2.1 for bottlewash operation and more detailed disposal instructions.
9.5.2 Wear a face shield, chemical resistant gloves and an apron when operating bottlewash.
9.5.3 As a courtesy to the next user, please leave the sink deck and surrounding work areas as you would like to find it. Use the techni-cloths provided in the nearby holder to wipe down and dry the deck. If you must temporarily leave a chemical process in place, be sure to use a process ID tag (tags can be found in the holder mounted on the side of this sink) filled out with your name, login, email address, any useful information, date, time, when you expect to return, and where you can be reached if necessary. Return all chemicals to the appropriate shelf in its respective cabinet.

9.5.4 Remove and dispose poly gloves if any, put your hand with the chemical gloves in the glove wash unit (Figure 5) for 30 seconds, D. I. water will wash your chemical glove automatically. Remove your hand. Put the other hand with the chemical gloves in the glove wash unit for 30 seconds and D. I. water will wash your chemical glove automatically. Remove your hand. Dry your chemical gloves with texwipes.

9.6 Sink Power

9.6.1 Power OFF - In case of emergency sink power can be shut off through EPO (red button) and in other cases by pressing the POWER OFF button on the sink control (MPC-901) panel. See Figure 2 for more details.

9.6.2 Power ON - Sink Power can be turned back on by pressing the POWER ON button located on the control panel at the top front side of the sink. See Figure 2 for more details.

9.7 Etiquette

9.7.1 Msink16/18 often have multiple lab members working at the sink simultaneously. You may arrive and find the sink already enabled and other members working there. You have a responsibility to introduce yourself and describe the process you plan to perform to the labmember that already has the sink enabled, also ask about his/her process. This is a critical safety issue; communicate with each other about your processing at these heavily used stations. Once you set up a process at this sink attend to it and be courteous to others working at this sink.

9.7.2 You may leave a beaker scale set up (process) at this sink and disable the sink, only if your process is properly labeled. Unidentified processes discovered by staff will be interrupted, chemicals will be disposed and parts may be lost. Your process must be attended or labeled at all times. This is regardless of who has enabled the sink and applicable to all members working at the sink at any given time.

10.0 Troubleshooting Guidelines

10.1 Sink power Off (Exhaust Photohelic Gauge Related issue) - Power will shut off to the sink, if the exhaust drops below the minimum set limit (0.5 inch of water) or exceeds the maximum set limits (1.0 inch of water) shown on Photohelic gauge. Turn the power on, and if it stays on then use the sink, perhaps a temporary excursion of air flow caused this issue. Otherwise, if the sink persists with shutting down and/or power does not come on/stays on, then report the problem on faults. Do not use sink until condition is checked by staff (Figure 3).

10.2 Alarm On - Press the alarm button to silence the alarm, and investigate the source of the problem, if it continues to alarm, then report as problem to staff.
11.0 **Figures & Schematics**

![Diagram of Msink16 Top View](imagedata)

**Figure 1 - Msink16 Top View**
Figure 2 - Msink 16 Control Panel

Figure 3 - Photohelic Gauge

Figure 4 - Proper Method of heating solvents with water in the dedicated tray

Figure 5 – Msink16 Glove Wash
Appendix-

12.0 Organic Waste Disposal

12.1 Msink16-18 Hazardous Waste Disposal and Waste Collection Instructions

12.1.2 Waste Collection Instructions: for each chemical waste addition, labmembers must record their username (NanoLab login), the chemical, and enter the type and approximate amount of liquid being added.

12.1.2 If this liquid has been used in a lift-off process, the lift-off metal must also be noted.

12.1.3 Clipboards mounted at msinks16-18 accommodate the Hazardous Waste Log Sheet. This sheet is to record every addition of waste added to the bottle.

12.1.4 There is a space on the manifest sheet for labmembers to add notes with any additional waste information.

12.1.5 It is the responsibility of labmembers to exchange waste bottles when 80% full; i.e. full to the shoulder of the bottle and to take these bottles to the designated “Yellow Full Pre-labeled Waste Bottle Cabinet” on each floor (chases 591 and 391.)

12.1.6 Labmembers that do not follow waste handling procedure will be suspended. Refresher classes on waste disposal at these sinks are offered periodically by the processtaff.

12.2 Bottle Change Instructions

12.2.1 Get an empty pre-labeled bottle from the “Blue Empty Pre-labeled Waste Bottle Cabinet” in chase 591.

12.2.2 Take the empty pre-labeled bottle to the sink location that you have removed the full bottle from.

12.2.3 Remove the funnel from the full bottle and substitute the white vented cap from the new bottle.

12.2.4 Remove the Hazardous Waste Log Sheet from the clipboard, fold into quarters, and place it into the pouch on the bottle. Make sure the bottle ID number on the yellow dot on this sheet matches the yellow dot ID number on the bottle.

12.2.5 On the full bottle, there now will be two sheets in the pouch. Use a safety carrier to transport the full bottle to the “Yellow Filled Pre-labeled Waste Bottle Cabinet” and place the bottle in the cabinet.

12.2.6 No unlabeled bottles may be placed in this cabinet. Only collected waste from msinks16-18 can go into this cabinet.

12.2.7 Return to the sink and start a new log sheet on the clipboard by noting the number on the yellow dot on the bottle neck and noting it on the blank Hazardous Waste log sheet on the clipboard.