

# Fundamentals of Micromachining: Lab Users Safety Meeting



Dr. Bruce K. Gale  
Instructor

January 2002

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# Agenda/ Topics to be Covered

- Objective
- General Lab Rules
- Alarms and Evacuations
- Chemicals
- Chemical Handling
- Compressed Gases
- Cryogenic Hazards



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# Agenda/ Topics to be Covered Continued



- Fire Hazards
- Electrical Safety
- Chemical Spill Emergency Response Plan
- Emergency Response for HEDCO Laboratory
- Location of Safety Items in the Lab Area
- Summary of Laboratory Procedures



- Accomplish our legal requirement to have a yearly safety meeting
- To establish workable ground rules and lab methods
- To obtain a usable official Lab Manual {Version 4}. Every one is responsible for reading and understanding the information inside.

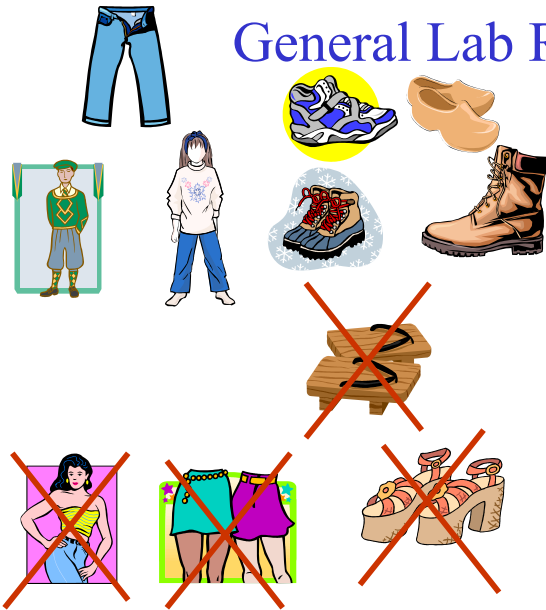
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## General Lab Rules



- Clothing – pants, tops, and shoes that cover the body (no shorts/skirts, cut-off blouses/tank tops, sandals).

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## General Lab Rules



- Never eat or drink in lab where chemicals are used.
- Return tools and lab items to their proper location.

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## Alarms and Evacuations

- Cover any exposed chemicals
- Put down any devices you are carrying.
- Leave the lab area through the shortest route
- DO NOT DEGOWN
- Do not return to the lab for anything
- Rendezvous at the steps in back of the MEB

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## Chemicals

- Acids and Bases
- Mixing- Always Add Acid (AAA)
- Ventilation- Always work under a hood
- Handling- Wear proper safety items and transport large quantities in a bucket.
- Disposal- Never wash a solvent down the drain



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## Chemicals Cont.

- Labeling- NFPA
- Cross Contamination- Avoid
- Spill clean up- splashing, small spills, etc.
- Keeping work area clean.
- Unsupervised chemical processes



- Name, date, chemical, and contact info (ie. Cubical #, room #, advisor)
- Define danger: Do not touch, Hot, Reactive

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## Chemical Handling

- Do a dry run
  - Note splash hazards
  - Use funnel when needed
  - Arrange process for ease of handling and prevention of exposure to chemicals



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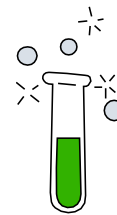
## Compressed Gases

- Locations
  - Tied down
- Users responsibilities
  - Close valve and cap when not in use
  - Use appropriate regulator
  - Understand handling procedure for specific gas
- Gas Lines- DO NOT TOUCH



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## Cryogenic Hazards

- Liquid Nitrogen ( $LN_2$ ) is available and in use
- Transporting Cryogenic Materials
  - Wear gloves and goggles
  - Use appropriate container

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## Fire Hazards

- Hot plates
- Reactive chemicals
- Electrical hazards
- Laser path
- Note location of fire extinguishers

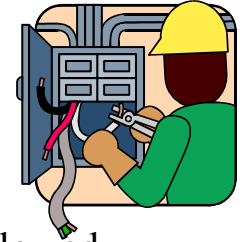


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## Electrical Safety

- Wiring of equipment is not allowed.
- Know where to kill power to tool.
- In case of shock do not touch victim. Use a non conductive material to push them away from the source.
- In case of power outage, leave lab area immediately.



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## Summary of Laboratory Procedures

- Always work in pairs (have a buddy)
- If don't know what a chemical is leave it alone. A clear liquid is **NOT** water.
- Wear proper safety materials at all times.
- Clean up after yourself
- Be considerate to others
- Safety first, Results second, and your outside personal life third.



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## Chemical Spill Emergency Response Plan



- Think responsibly . . . **Do not** attempt to clean up spills of concentrated acids or bases.
- Page the emergency response team leader
  - Indicate the emergency and the most immediate dangers.



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## Emergency Response for HEDCO Laboratory

- Stop what you are doing, cover experiment, close the door behind you and leave the building in the most direct path.
- Once outside move to the front of the building near the stairs leading EMCB



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## Location of Safety Items in Lab Area

- Fire Extinguishers
  - in the hallway: by L2, by docking bay, by expansion area, and by the shop
- Phones
  - cleanroom, metrology, shop, hallway between L2 and L3
- First Aid Kits
  - entrance of the cleanroom, outside L3, in the hallway of the teaching area, and in the shop



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## Location of Safety Items in Lab Area continued

- Fire Alarm Pull Handles
  - both entrances to the main lab areas, both entrances of the cleanroom and teaching area, by the docking bay and throughout the office area.



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