Laboratory Safety – Giannetta group

Chemical safety

Electrical safety

Liquid nitrogen, liquid helium

High pressure gas tanks

Magnetic fields (NMR magnets)

Machine shop

Division of Research Safety Website:

http://www.drs.illinois.edu/training/index.aspx
Chemical Safety

1. Complete the DRS online chemical safety training module.

2. Wear safety glasses and plastic gloves when dealing with hazardous chemicals. Hazardous chemical currently in the lab:
   - All organic solvents
   - Nitric, hydrochloric, sulfuric acids
   - Stayclean solder flux
   - Gold-plating solution
   - FeCl circuit board etching solution

3. Extended use of volatile solvents should be done in MRL fumehood.

4. Store organic waste solvents in appropriately marked plastic containers.

5. Store acid waste in appropriately marked plastic containers.

6. Extended use of volatile chemicals should be done in a fume hood.

7. Chemical waste disposal:
   a. Complete the DRS online chemical disposal training module.
   b. Mark waste containers appropriately, complete waste disposal forms.
   c. Request chemical request waste pickup from DRS.
Electrical Safety

1. Complete DRS online electrical safety training module:
   http://www.drs.illinois.edu/training/index.aspx

2. All equipment must be grounded. No “cheater plugs”!

3. Leak detector cab side panels must be in place before power is on.

4. Immediately remove instrument with frayed power cord, label it and let me know.

5. Recognize plugs for single phase 110 VAC (15 A, 20 A, 30 A) and 3-phase 208 VAC.
Liquid nitrogen and helium

1. Make sure helium storage tanks are vented to return line when not in use.

2. All helium dewars must have pressure release set no higher than 4 psi.

3. Do not transfer liquid helium into a space filled with liquid nitrogen.

4. If helium transfer tube becomes frosty, stop the transfer, remove the tube, warm it up, check vacuum jacket for leaks.
High pressure gas tanks

1. **Never** open a high pressure gas tank without a pressure regulator attached!

2. Tanks must be secured by (1) strapping to wall or table or (2) chained to rolling gas cart.

3. Attaching a regulator:
   a. Remove steel safety cap.
   b. **Close tank valve.** Again, **close the tank valve**!
   c. Thread regulator onto tank and snug with wrench. Don’t force it!
   d. Open tank value, note tank pressure.
   e. With tank valve and regulator valves open, adjust output pressure to desired value.
   f. When finished, close tank valve and the output valve.

4. Detaching a regulator
   a. Close tank valve
   b. Use wrench to loosen thread connection and unscrew regulator.
   c. Keep tank valve closed and screw steel safety cap back onto the tank.
   d. Wheel empty tank back to helium facility or other return location.

5. Oxygen tanks have a left-handed thread and require a special regulator.
Superconducting Magnets (4 and 9 Tesla)

1. Maintain required liquid nitrogen and helium levels above 30%.

2. Order nitrogen and helium in advance.

3. Make sure helium space is open to helium return line.

4. Make sure someone else can maintain liquid levels if you are away.

5. Remove any magnetic objects (tools, steel, rolling carts) that may be pulled into the magnet.

6. Visitors with pacemakers at least 10 feet away from either magnet.
1. Safety glasses must be worn at all times in the shop.

2. Use of power machine tools (lathe, mill, drill presses, grinder) only after student has earned an MRL shop key.

3. Sheet metal
   Drilling – for holes > ¼” diameter use only sheet metal-specific non-grabbing drills. **Do not use high speed drills!**
   No use of lathe for sheet metal, under any circumstances.
   Use the hand “nibbler” to cut holes in aluminum chassis.

4. Brass – Use brass drills only. **Do not use high speed drills!** Keep piece clamped securely in a vise for all drill press work.

5. Lathe – shut off main power switch (lower right side of lathe) after use. Remove chuck wrench from chuck immediately after securing piece.

6. Milling machine – remove the wrench from the spindle immediately after use. Do not leave mill unattended with power feeds running.


8. All tools and materials returned to proper location at the end of the day.

9. Do not leave shop door open after 5 PM.