ISSUE 1 | Winter 2016

Safety first

BRINGING A SAFETY WORKPLACE TO ALL MEMBERS OF THE CHEMISTRY BUILDING

Cryogenic Liquid Safety

Cryogenic liquids are liquefied gases kept liquid at extremely low temperatures. Most cryogenic liquids have a boiling point below -150°C (-238°F) and all are gasses at room temperature.

There are many hazards associated with cryogenic liquids. For example, liquid nitrogen is at -210°C (-346°F) and can cause severe thermal burns but can also cause asphyxiation from the nitrogen gas it lets off.
Everyone working in labs that use cryogenic liquids should read and sign off on the OSEH SOP for Cryogenic Liquids which can be found here:
http://www.oseh.umich.edu/guidelines/clu.shtml

Whenever handling cryogenic liquids the minimum required PPE is:

- Safety glasses/face shield
- Labcoat
- Cold gloves

Dewars in Elevators

When transporting large dewars of cryogenic liquid it is important to remember that even small amounts of liquid can create large amounts of gas (for example just one liter of liquid nitrogen creates 694 liters of nitrogen gas). Consequently, it is important to avoid transporting or storing full dewars to small or poorly ventilated areas.
This expansion also makes it dangerous to travel in an elevator with a dewar. If a large dewar fails it could quickly fill the elevator and shaft with nitrogen and asphyxiate the occupants before the elevator could reach the next floor.
The preferred way of taking large cryogenic dewars is to use the buddy system. Have one person send the dewar to the proper floor by itself while taking a different way up and the other person waits on that floor for it to arrive and offloads it.
If you see a dewar by itself on an elevator DO NOT GET ON THE ELEVATOR WITH IT!

For more information please see the OSEH SOP on Cryogenic Liquids .

SAFETY WATCH

There have been several incidents on campus involving the use of highly toxic powders such as cyanide. Please remember to use extreme caution when handling these materials and only use them under a fume hood with proper PPE. Additionally many of these powders react violently with acids to create toxic gases. Refer to the SOP on "Highly Toxic Chemicals" for more information.

Lessons Learned

Razor Blade Incident

A graduate student was using a razor blade to cut a piece of tubing when the razor slipped off of the tubing and cut the tip of their finger. In this case the cut caused the student to need four stitches.

For labs that cut tubing on a regular basis it is recommended to get a tool designed specifically to cut tubing. If you must cut tubing using a razor blade **always cut away from yourself!**

Examples of tubing cutters can be found from both VWR and Fisher and can cut a variety of tubing sizes and materials.

Bel-Art™ SP Scienceware™ Plastic Tubing Cutter
Fisher Catalog #22-088245

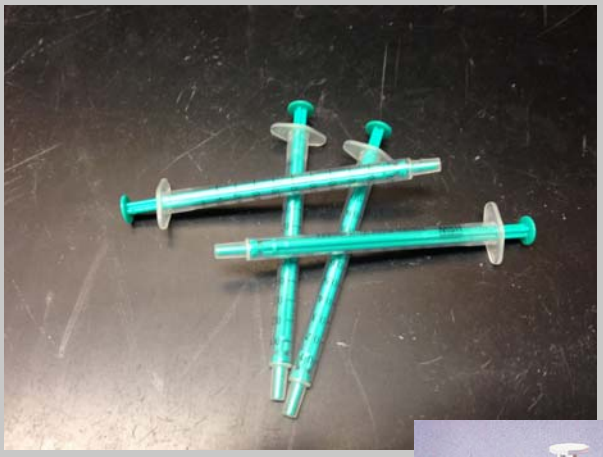
Spectra/Chrom™ Tubing Cutter
Fisher Catalog #11-187-15

Syringe Incident

A graduate student instructor for a Chemistry 216 class was using a 1 mL syringe to measure out acid for student's experiments. Later in the class it was noticed that the syringe had been taken by one of the undergraduate students to use to measure acetic anhydride. The GSI took back the syringe without realizing it still contained ~0.4 mL of acetic anhydride. Several minutes later the GSI accidently pressed the plunger on the syringe causing the acetic anhydride to go into their nostril.

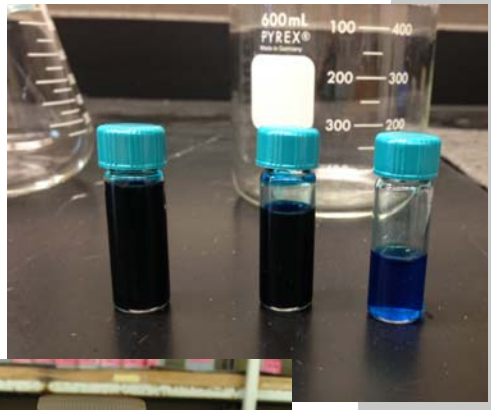
This incident showed us that although syringes are a quick, cheap, and accurate device for measuring liquids they have the potential of being extremely dangerous if not used correctly.

A safer alternative for labs that regularly use syringes for measurement is pipetters such as those shown to the right. These alternatives are safer, relatively cheap, just as accurate as the syringes.



Explosive Results

Explosions are a thankfully rare occurrence in laboratories but with some types of research they are an all too real possibility. Recently, there have been several explosions on campus including one in the Chemistry building. Although incidents like these are something we never want to see in the lab when they do occur, we can learn from what went right and wrong to help prevent them from happening again in the future.



Hydrogen Peroxide Explosion

A Postdoc was working with a 4 mL sample vial containing ~80% hydrogen peroxide as well as a metal organic framework consisting of copper metal ions and DNBT (5,5'-Dinitro-2H,2H'-3,3'-bi-1,2,4-triazole) linkers. This was the first time this combination had been created so the how it would react was still unknown.

After mixing the materials a pressure buildup in the vial was noticed and unscrewing the lid was attempted to relieve the pressure. Unfortunately it was too late and the pressure building from the decomposed hydrogen peroxide caused the vial to explode while the postdoc was holding it.

The lab was extremely prompt in contacting 911 as well as having direct pressure placed on the cuts to minimize the bleeding. The student was thankfully okay but suffered severe cuts on the hand including one that required stitches. The explosion was caused by a pressure buildup from the hydrogen peroxide rapidly decomposing in a vial while being capped.

This incident shows how important it is to do as much research into the possible interactions of the chemicals you are using. In many cases in research there is only limited information about the reaction being done. In these cases, the utmost precautions should be taken to help prevent unknown reactions from occurring.

LSI Explosion

An explosion occurred in the Life Science Institute building overnight on a weekday. The explosion occurred 5-10 minutes after a graduate student left the room to go back to their office. The explosion was powerful enough to blow open cabinet doors and even pop out ceiling tiles in the nearby highway. The student heard the noise and reentered the room to find fire spreading across the floor as well as fire inside of the cabinets under the hoods and on some cardboard boxes on the floor. The student retrieved the closest fire extinguisher, a Class-D extinguisher, and attempted to put out the fire while another person in the lab called 911. The fire extinguisher was not appropriate to put out the fire so an ABC Multi-Purpose dry chemical fire extinguisher was retrieved from the corridor and used it to extinguish the remaining flames.

A broken 4-liter glass bottle labeled “hexane” was found on the floor near where the incident occurred with the cap still attached. A drying oven was located under the counter and was on at the time of the explosion. The incident is still under investigation but the likeliest cause was that the bottle of hexane had been placed too close to the edge of the counter causing it to fall and break after the student left the room. Some of that hexane then ran into the hot oven causing the explosion.

There are several things we can take away from this incident even without yet knowing the exact cause.

The most important thing we can learn from this incident is how important it is to put items away in their proper place after using them. If the hexane bottle had been placed in a flammable liquids cabinet or even placed securely on the counter away from the edge this incident would not have taken place.

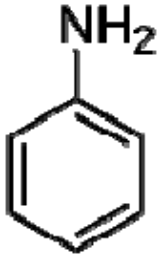
Additionally at the time of the incident the counters were extremely cluttered so there was no safe place to put the bottle. Untidiness is an issue even here in Chemistry. We should always make attempts to clean and put away as many items and chemicals as we can whenever we stop using them and make sure everything is clean and organized before leaving for the day.

The next thing that we can learn from is the use of a fire extinguisher. Please remember that no one is ever expected to use a fire extinguisher to put out a fire. If you are not comfortable doing it just go and get help instead of trying to put it out yourself. Additionally, only try to put out a fire if you have been properly trained in the use of a fire extinguisher. We have a training session on this every fall for graduate students and postdocs.

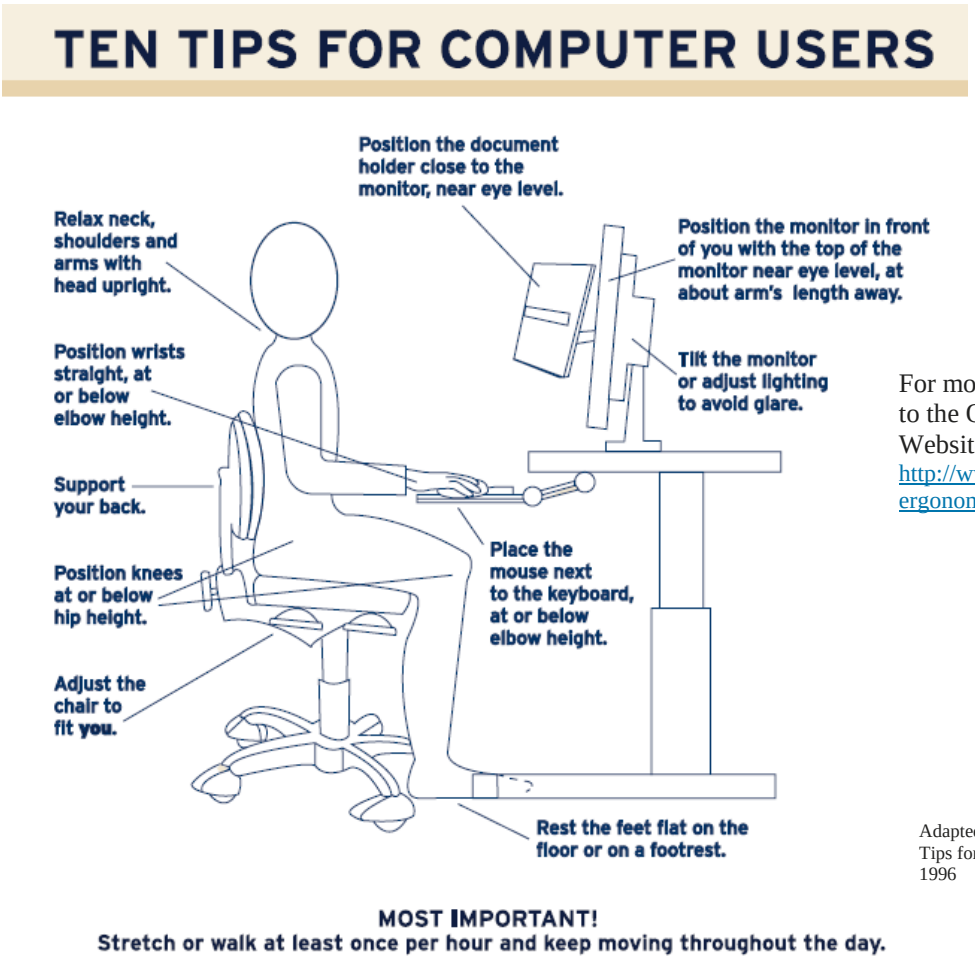
It’s easy to forget that different fire extinguishers are designed to put out certain types of fire. The Class-D fire extinguisher used in this fire is designed to put out pyrophoric materials such as sodium and magnesium fires and works by encapsulating the material on fire so this was not the correct one to use with a solvent fire. The ABC extinguisher used later in the fire was far more effective. In the Chemistry Building we mainly have Class BC extinguishers that can be used to put out most fires that occur in a lab and since they are filled with carbon dioxide they have the added bonus of not causing a large powdery mess to clean up after the fire. PLEASE REMEMBER TO CONTACT DPSS AND TRACY STEVENSON ANYTIME A FIRE EXTINGUISHER IS USED.

Aniline Citation

Recently our waste vendor was cited for anilines showing up waste streams that were not labeled as having them. If you are working with anilines please make sure that material is listed on the waste label.



Ergonomics Corner

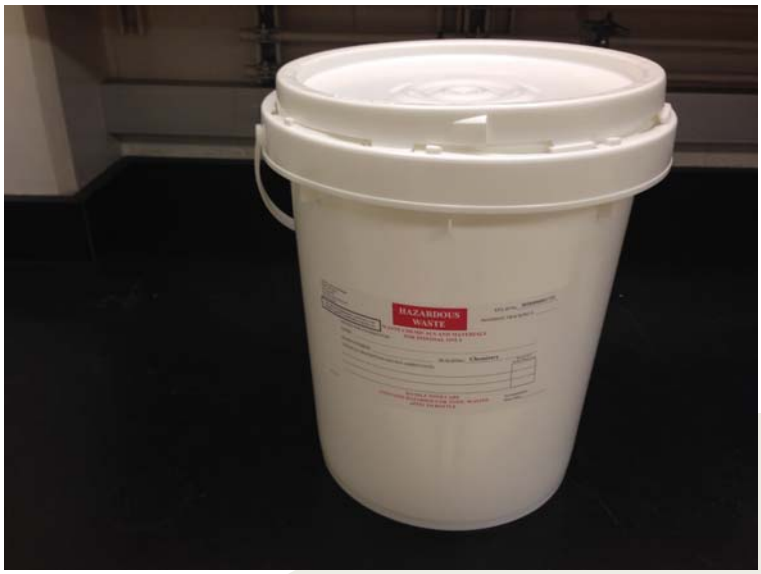


For more information go to the OSEH Ergonomics Website at: http://www.oseh.umich.edu/ergonomics/index.shtml

Adapted from 12 Golden Tips for Office Workers, 1996

Waste Reminders

- ◊ Pails are for solid waste and debris only, NOT liquids.
- ◊ Vials should always be emptied into a liquid waste bottle before disposing of them in a pail.
- ◊ Labels on all waste containers should list all hazardous constituents, no generic items like “acids” or “halogenated solvents”
- ◊ Hazardous waste containers should never be used for storage of nonhazardous items or materials



Laboratory Dress Requirements

Last year the laboratory dress requirements for all laboratories on campus were modified. The biggest change is that shorts and skirts are no longer allowed in the lab. This will severely impact many of us during the expectant hot summer. The best way we've found to deal with this rule is to keep a pair of jogging/ workout pants at work and put them on over your shorts when working in the lab. This way you're safe and don't have to go outside in long pants. As a reminder, the dress requirements for labs is shoes that completely cover your feet (no open-toed shoes, sandals, or flip-flops), shirts that completely cover the torso, and pants. In addition to the dress requirements please also keep in mind that when working in labs safety glasses or goggles and labcoats must be worn at all times.

Shorts, skirts or pants that leave any part of the leg exposed are not allowed.

CHEMICAL HYGIENE PLAN

Upcoming Inspection

Anytime now

Please remember that we are still on schedule to receive an MDEQ Inspection. Please make sure all of your waste pails and bottles are properly labeled, dated and no older than 60 days. Also please keep all bottles capped when not being filled

Events

Classes begin	Jan 6, Wed
MLK Day	Jan 18, Mon
Winter Break	Feb 27, Sat
Classes Resume	Mar 7, Mon
Classes end	Apr 18, Mon
Study Days	Apr 19, Tues & Apr 22-24, Fri-Sun
Examinations	Apr 20-21, Wed-Thur & Apr 25-28, Mon-Thur
Grades Due	72 Hours After Exam
Commencement	Apr 28 - May 1, Thur-Sun

Dry Ice/LN2

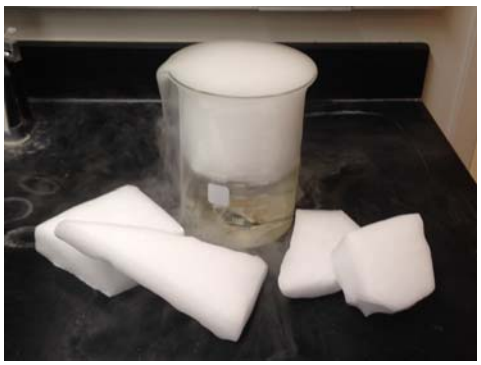
Dry Ice

Dry ice is available from 10:00am-11:00am and from 2:00pm-3:00pm Monday-Friday in room A601

Liquid Nitrogen

Department dewars are accessible 24 hours a day outside of room A602 for small (under 15L) of liquid nitrogen quantities.

Large dewars of liquid nitrogen can be ordered by emailing chrpeter@umich.edu or steventi@umich.edu at least one business day before it's needed.



Contact Information

Package Shipping
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Waste Issues
Laurie MacDonald—lanald@umich.edu

Safety Issues/Concerns
Christopher Peters—chrpeter@umich.edu
Tracy Stevenson—steventi@umich.edu

Vertere Questions
Anson Pesek—ahpesek@umich.edu

Maintenance Requests
Routine Work Request Form on Chemistry Intranet

This puppy wants you to be safe