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EHS Lab Chatter

UNIVERSITY OF NEW ENGLAND
INNOVATION FOR A HEALTHIER PLANET

EHS
ENVIRONMENTAL HEALTH AND SAFETY

Table of Contents:

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Safety Spotlight

All About Cleaning and Maintaining Laboratory Glassware

Even the most carefully executed experiment can give erroneous results if dirty glassware is bought to use. If the glassware that is used for measuring liquids is contaminated with grease and other materials, it prevents the glass from being uniformly wetted. This in turn will affect the volume of liquid delivered and the amount of residue adhering to the walls of the container. Likewise, presence of impurities in glass labware can distort the meniscus and can prevent one from getting the correct results out of the science lab experiment.

Keeping the laboratory glassware physically neat and clean, free of grease, and bacteria is therefore of the utmost importance.

To keep your glass labware neat and clean, you must wash it immediately after use. Put glassware in water if you can not clean it immediately otherwise the residue will stick to the labware and it would get difficult to remove it.

For washing the glass labware, make use of soap, detergent, or cleaning powder. Try to use soap and cleaning powder without any abrasives as it can scratch the glass. However, for glassware that is too dirty, you can make use of cleaning powder with mild abrasive action to get good cleaning results. Chromic acid solution is quite effective in cleaning unduly clouded or dirty glassware. For scrubbing the glassware thoroughly, you must use a brush.

After cleaning, rinse the glassware with tap water. Allow the water to run into and over the glassware and then fill each piece with water. Fill test tubes, flasks, and other glassware with water and shake and empty them. Do this for at least 5-6 times to clean the glassware properly. For cleaning contaminated glassware, you will have to sterilize them too.

Washed labware must either be placed in a basket with their mouth downwards for allowing them to dry completely or they should be made to dry in an oven. You can also hang test tubes, flasks, and other labware on wooden pegs for drying them out. Stand dry cylinders, burets, and pipets on a towel for drying them properly.

Place clean glassware in a cabinet to protect it from dust. You can also make use of cotton, or cork, or can tape a piece of paper on the mouth of the glassware to prevent dirt and dust from entering the glassware. Keep washed, cleaned, and sterilized glassware pieces in special racks and at a distance to avoid any breakage.

With proper care and maintenance you can not only increase the life of your labware, but can also enhance your lab safety.

Source:

https://www.sciencefirst.com/all-about-cleaning-and-maintaining-laboratory-glassware/

Labeling – make it right; make it last

By Peter Nagle

Labeling can seem like a small detail, but when you consider the information labels convey, it is a critical one. Proper labeling goes beyond putting the right information on the label. It also includes making sure the information is not lost because a label falls off or the ink becomes smeared on the label. Below are some items to consider when labeling a container.

Is the label going to be exposed to harsh conditions during an experiment or storage?

It can be frustrating when a label fails during an experiment or while in storage, and can even have dangerous results when hazardous chemicals stored in the lab are unlabeled. Unfortunately, many laboratory conditions can inhibit the function of a label and even dissolve inks used in permanent markers (Sharpies) ultimately washing away important information. The following harsh conditions can have a detrimental effect on labels including dissolving inks:

- Extreme heat
- Extreme cold
- Exposure to certain chemicals such as ethanol
- Moisture

If handwriting make sure to use the correct writing tool.

As stated above, Sharpies are not always permanent. Cryogen pens are ideal for writing on frozen tubes & vials, with ink that remains legible when exposed to water, frost, and even alcohols. There are also specialty marker pens made specifically for writing on ink-resistant surfaces like plastic, glass and metal.

Use printed labels over handwriting if you can.

Pre-printed labels are less likely to become smeared than handwritten ones. Also pre-printed labels eliminate the guesswork often brought on by indecipherable handwriting.

You can have constituents pre-printed on Hazardous Waste Labels if there is the possibility that the ink from Sharpies can become smeared by exposure to flammable solvents.

Use the proper label for the storage and/or experimental conditions.

Sometimes a durable label simply isn't compatible with the application, such as direct-thermal labels, which turn completely black in an autoclave or ordinary labels which tend to lose their stickiness in extremely cold conditions. It's essential to both the work and safety of a researcher that labels retain important information under a wide range of environments.

Put your name on your containers.

This is important in a shared storage space. By putting your name on your work you can avoid confusion and the possibility of having your container discarded by someone who accidentally identifies your container as abandoned.

Plan ahead.

Doing a little research beforehand on the types of conditions your labels will need to withstand can go a long way in making sure important information stays with the material you are labeling. A wide array of specialty labels and pens have been developed for a range of very specific laboratory applications. Below is a sample of a few that are used in laboratories:

- Cryogenic labels
- Xylene resistant labels
- Polyester labels- best for heat resistance
- Cryogen pens
- Tamper evident labels

If you have any questions you can always contact the Environmental Health & Safety Department (EHS).

Submitted by Ronnie Souza via Lab Manager Magazine:

Stripper, Anyone?

Now that we have your attention, we have to dash your hopes. This is not a column about Vegas and "what happens in Vegas, stays in Vegas" kind of fun. It is going to provide vital safety information on one of the most widely used laboratory solvents. The title is derived from what is probably the best-known common use of the term outside laboratories— i.e., a chemical stripper or stripping agent.

By Vince McLeod | March 05, 2015

Complying with OSHA Standards Regarding Methylene Chloride

If you have ever refinished an old, treasured piece of furniture or tried to remove paint from an item being restored, you have most likely reached for Strypeeze®, the orange stuff, or a similar paint/varnish stripper at your local hardware store. That is methylene chloride, also known as dichloromethane, a potentially dangerous solvent responsible for at least 13 fatalities since 2000.

In the February 24, 2012, Morbidity and Mortality Weekly Report (MMWR), the Centers for Disease Control and Prevention published a brief report on methylene chloride fatalities among bathtub refinishers.1 The CDC report states that OSHA identified 10 deaths related to methylene chloride stripping agents, and another three were investigated by the Michigan FACE (Fatality Assessment and Control Evaluation) program from 2000 to 2011. Granted, these fatalities are extreme cases involving bathtub refinishers and aircraft-grade stripping agents, scenarios not likely to occur in our laboratories. But when you consider that the average amount used in each case was only six fluid ounces (177ml) and that exposures as short as one hour were all it took, they do demonstrate vividly the potential dangers of working with methylene chloride.

In fact, methylene chloride and its associated hazards are serious enough for OSHA to produce a specific standard covering its use in the workplace— 29CFR1910.1052.2 The standard sets action levels, permissible exposure limits, and requirements for compliance—all the usual things that we will distill for you shortly. First let's get to know a little more about the chemical we are using.

The lowdown—Uses, chemical/physical properties, symptoms, and effects

In laboratories, the most common use for methylene chloride is as a solvent, especially as an extraction liquid for gas chromatography. Other uses include metal cleaning and degreasing, serving as a process catalyst, pharmaceutical and adhesive manufacturing, polyurethane foam and polycarbonate resin production, and chemical stripping, among many others. It is a colorless liquid with a moderately sweet aroma, similar to chloroform. Methylene chloride is highly volatile, with a low boiling point (104°F) and vapor pressure (350mm Hg). When those are combined with its heavier-than-air molecular weight (85), methylene chloride is a serious inhalation hazard.

continued on next page....

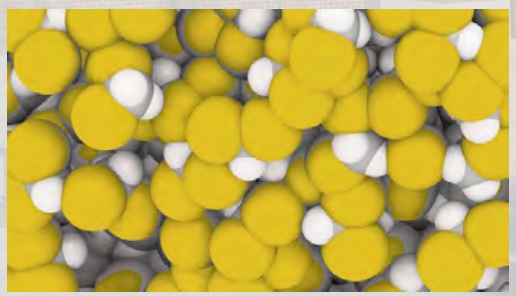
The primary exposure route for methylene chloride is inhalation, although absorption through the skin is also a concern. Acute inhalation produces central nervous system depression, and at very high concentrations can lead to narcosis, eventually causing respiratory failure and death. Since methylene chloride is metabolized to formaldehyde and carbon monoxide, chronic exposure can produce CO-type symptoms of headache, nausea, vomiting, confusion, and dizziness. Skin contact can result in irritation and chemical burns. In addition, OSHA considers methylene chloride a potential occupational carcinogen.

Assessment first

The OSHA standard covers all occupational exposure to methylene chloride in general industry in all workplaces (separate standards cover shipyards and construction sites). If this solvent or chemical is used in your workplace, an exposure assessment and a hazard evaluation are required for those employees handling the material. The OSHA action level (AL) is 12.5ppm (parts per million methylene chloride in air), and if this is reached or exceeded, it triggers compliance activities such as monitoring and medical surveillance. The permissible exposure limit (PEL) is 25ppm, at which point employers must use engineering and work practice controls to limit employee exposures. Both the AL and the PEL are based on eight-hour time-weighted averages (TWA) or, in other words, an average exposure for a full work shift. Respiratory protection is an alternative as an interim measure while controls are being put in place or if engineering controls are insufficient or unavailable.

There is also a short-term exposure limit (STEL) of 125ppm based on a 15-minute TWA. This level should never be exceeded. To complete the standard, the limit for exposure immediately dangerous to life and health (IDLH) is 2,300ppm.

Assessments are conducted by measuring the air concentrations near the worker's breathing zone for a representative number of employees for each process or task where the chemical is used. An initial assessment and monitoring are required unless the employer has objective data that demonstrate the highest potential exposure (worst case scenario) does not exceed the AL and STEL or exposures are for fewer than 30 days per year.



Then compliance

Once the initial assessments are completed, the data are evaluated. If the AL and/or STEL are exceeded, then periodic monitoring is required, following Table 1 below.

(see next page)

TABLE 1: MONITORING REQUIREMENTS	
EXPOSURE SCENARIO	REQUIRED MONITORING ACTIVITY
Below the action level (12.5 ppm) and at or below the STEL (125 ppm)	No eight-hour TWA or STEL monitoring required
Below the action level (12.5 ppm) and above the STEL (125 ppm)	No eight-hour TWA monitoring required; monitor STEL exposures every three months
At or above the action level (12.5 ppm), at or below the PEL (25 ppm TWA), and at or below the STEL (125 ppm)	Monitor eight-hour TWA exposures every six months
At or above the action level (12.5 ppm), at or below the PEL (25 ppm TWA), and above the STEL (125 ppm)	Monitor eight-hour TWA exposures every six months and monitor STEL exposures every three months
Above the PEL (25 ppm TWA), and at or below the STEL (125 ppm)	Monitor eight-hour exposures every three months
Above the PEL (25 ppm TWA) and above the STEL (125 ppm)	Monitor eight-hour TWA exposures and STEL exposures every three months

Regulated areas are established and clearly marked for all spaces where the PEL and STEL levels are exceeded. This includes any area where the limits are expected to go above the PEL or STEL. Minimize the number of employees authorized to enter these areas.

Hazard communication must inform all affected employees of the dangers of working with methylene chloride, including the health effects, symptoms of exposure, and safety requirements.

Finally, employers must implement a medical surveillance program and include every employee covered by the OSHA standard. The medical surveillance is provided at no cost to the employee and includes an initial physical exam and medical history, periodic exams based on the employee's age, emergency exams following any incident, and exams at reassignment or the end of employment.

References

1. Fatal Exposure to Methylene Chloride Among Bathtub Refinishers, Centers for Disease Control and Prevention, Atlanta, GA. 2012. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6107a2.htm

2. Methylene Chloride, Occupational Safety & Health Administration, US Department of Labor, Washington, D.C. 2003. http://www.epa.gov/airtoxics/hlthef/methylen.html

The revised UNE Chemical Hygiene Plan

By Jessica Tyre

OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard (29CFR1910.1450) outlines the requirement of all laboratories to have a Chemical Hygiene Plan (CHP) with specific details of how employees are protected from laboratory hazards. This standard includes what elements need to be covered in your Chemical Hygiene Plan, worker training requirements, and when medical evaluations and consultations are necessary.

UNE has a written Chemical Hygiene Plan that is adopted by all UNE laboratories across all campuses. Each lab must have a copy of the plan with details about their lab on the cover sheet. The plan must be accessible in the lab area via a hard copy or an electronic copy on a computer that all lab staff can access at any time with no obstacles. Once the lab has completed the cover sheet to make it specific to their area they should then add any lab specific SOPs to their plan. There are a few SOPs that most labs use already in the plan for basic lab operations. Since each lab has their own unique activities, they need to make sure their CHP is complete for their area, based on the hazards present.

The UNE Chemical Hygiene Plan was just updated in December 2019 and is now available on the EHS website on the homepage or under "Publications" (https://www.une.edu/publications).

Please make sure to follow these steps to make sure your lab area is up to date:

1) Go to the UNE EHS web page and find the UNE CHP.

2) Download and save the UNE CHP.

3) Update the cover page to reflect your lab's information

4) Add in SOPs specific to your lab area.

5) Keep the UNE CHP in your lab area and accessible to all lab personnel.

This is an OSHA requirement so please take the time to complete this at your earliest convenience. For more information on Chemical Hygiene Plans, please see the OSHA Quick Card on the next two pages of this issue of EHS Lab Chatter. If you need any assistance please contact UNE EHS. Thank you!!

OSHA® FactSheet

Laboratory Safety Chemical Hygiene Plan (CHP)

OSHA's Occupational Exposure to Hazardous Chemicals in Laboratories standard (29 CFR 1910.1450), referred to as the Laboratory standard, specifies the mandatory requirements of a Chemical Hygiene Plan (CHP) to protect laboratory workers from harm due to hazardous chemicals. The CHP is a written program stating the policies, procedures and responsibilities that protect workers from the health hazards associated with the hazardous chemicals used in that particular workplace.

Required CHP Elements

1. Standard operating procedures relevant to safety and health considerations for each activity involving the use of hazardous chemicals.
2. Criteria that the employer will use to determine and implement control measures to reduce exposure to hazardous materials [i.e., engineering controls, the use of personal protective equipment (PPE), and hygiene practices] with particular attention given to selecting control measures for extremely hazardous materials.
3. A requirement to ensure that fume hoods and other protective equipment are functioning properly and identify the specific measures the employer will take to ensure proper and adequate performance of such equipment.
4. Information to be provided to lab personnel working with hazardous substances include:
   - The contents of the Laboratory standard and its appendices.
   - The location and availability of the employer's CHP.
   - The permissible exposure limits (PELs) for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard.
   - The signs and symptoms associated with exposures to hazardous chemicals used in the laboratory.
   - The location and availability of known reference materials on the hazards, safe handling, storage and disposal of hazardous chemicals found in the laboratory including, but not limited to, the Material Safety Data Sheets received from the chemical supplier.
5. The circumstances under which a particular laboratory operation, procedure or activity requires prior approval from the employer or the employer's designee before being implemented.
6. Designation of personnel responsible for implementing the CHP, including the assignment of a Chemical Hygiene Officer and, if appropriate, establishment of a Chemical Hygiene Committee.
7. Provisions for additional worker protection for work with particularly hazardous substances. These include "select carcinogens," reproductive toxins and substances that have a high degree of acute toxicity. Specific consideration must be given to the following provisions and shall be included where appropriate:
   - Establishment of a designated area.
   - Use of containment devices such as fume hoods or glove boxes.
   - Procedures for safe removal of contaminated waste.
   - Decontamination procedures.
8. The employer must review and evaluate the effectiveness of the CHP at least annually and update it as necessary.

Worker Training Must Include:

- Methods and observations that may be used to detect the presence or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
- The physical and health hazards of chemicals in the work area.

- The measures workers can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect workers from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- The applicable details of the employer's written CHP.

Medical Exams and Consultation

The employer must provide all personnel who work with hazardous chemicals an opportunity to receive medical attention, including any follow-up examinations which the examining physician determines to be necessary, under the following circumstances:

- Whenever a worker develops signs or symptoms associated with a hazardous chemical to which the worker may have been exposed in the laboratory, the worker must be provided an opportunity to receive an appropriate medical examination.
- Where exposure monitoring reveals an exposure level routinely above the action level (or in the absence of an action level, the PEL) for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance must be established for the affected worker(s) as prescribed by the particular standard.
- Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the likelihood of a hazardous exposure, the affected worker(s) must be provided an opportunity for a medical consultation to determine the need for a medical examination.
- All medical examinations and consultations must be performed by or under the direct supervision of a licensed physician and be provided without cost to the worker, without loss of pay and at a reasonable time and place.

For additional information on developing a CHP, consult the following sources:

- View the complete standard at the OSHA Web site, www.osha.gov.
- Appendix A of 29 CFR 1910.1450 provides non-mandatory recommendations to assist in developing a CHP.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; the teletypewriter (TTY) number is (877) 889-5627.

For assistance, contact us. We can help. It's confidential.

OSHA FS-3461 8/2011
DSG

WINTER SAFETY TIPS

Raking isn't just for fall

Roof rakes allow you to safely remove snow from your roof and prevent roof collapses.

BE PREPARED for a power outage

Research alternative heat sources and have an emergency kit with three days' worth of food, water, medication and other supplies.

Know how to brake on wet, icy or snowy roads

If you have antilock brakes, apply firm, continuous pressure. If not, pump the brakes gently.

INSPECT YOUR TIRES

As the temperature drops, so does tire pressure. Check your vehicle's tire pressure and make sure each tire is filled to the vehicle manufacturer's recommended inflation pressure.

Avoid FLOODING

- Remove snow piled against your house.
- Carefully remove gutters of debris.
- Seal all cracks in your foundation.

Prevent FROZEN PIPES

Insulate your pipes and keep your house temperature above 32 degrees (water's freezing point).

What's a winter weather advisory?

A weather term used when conditions are likely to cause significant inconveniences and may be hazardous. Use caution.

Be careful with SPACE HEATERS

They're the leading source of fires in winter. Use one with an automatic shutoff feature and keep away from flammable items.

Sources: Insurance Institute for Business & Home Safety and National Highway Traffic Safety Administration.

6 Tips to Avoid Slips in the Winter

1. When outside wear shoes or boots with heavy treads for increased traction and avoid icy areas.
2. Keep walkways, stairways, and other work areas clear by removing hazards like snow immediately.
3. Look where you are going and have your hands ready to steady yourself should you slip.
4. Avoid carrying heavy loads that may compromise your balance.
5. Mark hazardous areas by using signs, cones, or barricades to warn pedestrians.
6. Make yourself visible to drivers by wearing a brightly colored jacket or clothing.

UNE Chemical Sharing Program

The UNE Chemical Sharing Program is a great way to reduce hazardous waste, reduces costs for your department, and have a positive environmental impact on campus. If you have any commonly used lab chemicals or lab equipment that you are thinking of disposing, please contact EHS so they can be listed in the next issues of EHS Lab Chatter as available for the UNE Chemical Sharing Program.

Available now:

No items currently available.

****All background images are taken from the UNE Digital Asset Manager files****