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Department of Occupational and Environmental Safety NEWSLETTER

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Gloves and Chemical Compatibility

Gloves are the single most common form of personal protective equipment in the lab. But if you are using gloves that are incompatible with certain chemicals, you may not be protecting yourself as well as you think. Several types of gloves are available and one kind may be more appropriate than another, depending on the job at hand.

Most gloves come in both single-use (or disposable) and reusable forms. Disposable latex gloves offer little protection against most hazardous liquid materials and should only be used for non-toxic or non-hazardous materials. Reusable gloves offer more protection than disposables, so use the thicker gauge glove with more dangerous chemicals.

The most common types of gloves are made from:

• Latex (or natural rubber)— Latex gloves are most common in disposable form, offering excellent conformity and dexterity. Therefore, they are good for quick jobs (when you only need gloves for a few minutes) and are resistant to most acids and alkalis.

• Neoprene— Neoprene provides protection against a wide range of corrosive chemicals; it resists oils, greases, alcohols, resins, alkalis, and many solvents. It is poor for chlorinated aromatic solvents, phenols, and ketones.

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Dimethylmercury Causes a Death

An article appeared recently about the death of a researcher at Dartmouth College who was using dimethlymercury in her work. Since this compound is used on campus, we felt it was appropriate to provide a synopsis of the article.

The cancer researcher died in early June, 10 months after as little as a drop of dimethylmercury absorbed and passed through her rubber gloves. Dimethlymercury looks like water but is three times as dense. More so than regular mercury, it is attracted to the oil in the human skin and is readily absorbed by the body. Tests showed that this researcher had 80 times the lethal dose of mercury in her blood.

Mercury attacks the central nervous system before the victim shows symptoms; in this case, the researcher began losing her balance and hav-

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What WASTE!

Mercury Wastes

Since mercury is such a highly toxic chemical, few landfills continue to accept waste containing this dangerous material. Below are two suggestions for reducing the mercury in your lab.

Cutting Down on Mercury Salts

Try to find a suitable non-hazardous substitute for mercury salts. If your research requires the use of mercury salts or organic-metallic salts containing mercury, make sure you purchase only the exact quantity of these items needed. There are practically no disposal sites that continue to accept items with mercury in them. These same disposal difficulties apply to mercury salts and compounds containing mercury—mercuric chloride, mercuric oxide, mercuric acetate, or mercurochrome.

If you have questions concerning a mercury substitute, call DOES at x2907.

Use Non-Mercury Thermometers

Various companies have created a non-mercury "environment friendly" thermometer. Though they are slightly less accurate than mercury thermometers, they are also much cheaper—about one fourth the cost. Because the thermometers contain no mercury, clean-up is easy if an accident occurs and no hazardous waste is created.

Equipment used in conjunction with thermometers—heat blocks, ovens, incubators—becomes contaminated if a mercury thermometer should break during the experiment. The equipment must often be thrown out since mercury may bond with metal. Mercury is also more volatile in hotter temperatures, and it evaporates quickly, so be extremely careful in this type of situation.

In order to reduce hazards associated with mercury, please consider purchasing an alcohol thermometer for your laboratory.

Mercury Storage Tips

• Keep containers covered and stored in secondary container in a well-ventilated area.

• Check tubing and glassware periodically for leaks and cracks.

• Consider using a drip pan to contain possible spills where mercury is stored.

• Mark all mercury containers correctly with hazardous chemical labels.

Please feel free to call Safety Services at any time (x2907) with waste or storage questions.

Upcoming Training Sessions

Radiation (x2906)

•**New Training:** July 24(9-12); Aug.5(1-4), 15(9-12), 27(1-4)
•**Retraining:** July 31(10-11); Aug.4(2-3), 13(10-11), 26(2-3)
•**X-ray Training:** call office to set up a training session

Chemical (x2907)

•**OSHA Lab Standard:** Mondays 1-3 (Service Building Conference Room)

Bloodborne Pathogen (x2907)

•**New Training:** Mondays 3-4:30 (Service Building Conference Room)
• **Retraining:** July 10 (10-11:30), 23(2-3:30) (Service Building Conference Room)
Please call to reserve a space for BBP Retraining sessions; space is limited.

Dimethylmercury Causes a Death

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ing trouble speaking and hearing in January, though she spilled the mercury five months earlier, in August. Three weeks after she was diagnosed at the end of January, she fell into a coma, which lasted until her death in early June.

Tests by an independent laboratory after the spill showed that dimethlymercury can pass through rubber latex gloves quickly, usually without damaging them. Says a fellow researcher: "It's not like a discolored spot appears, the glove rips open or smoke and fire comes out of the glove . . . . I think all of her colleagues in this area of research around the world have been stunned that the gloves she was wearing were not sufficient protection."

The Dartmouth College scientist was using dimethylmercury to examine the effects of toxic metals on the body, specifically how mercury prevents the cells from repairing themselves.

If you use dimethylmercury in your work, even in minute amounts, please contact us at x2907. Options can then be discussed as to how to work safely with this compound.

HOT TIPS

Internal Transfers of Radioactive Material

It has come to our attention that internal transfer of radioactive materials prior to approval from the Radiation Safety Office (RSOF) sometimes occurs. This procedure violates terms of our licensed programs. Therefore, do not transfer radioactive material, either internally or externally, until the proper forms have been completed and approved.

A copy of the "Authorization for Internal Transfer of Radioactive Materials" form is found in the Radiation Safety Manual (form 8). Both the sending and receiving Authorized Users (AUs) should sign the form. Send the form on to the RSOF for approval; a copy of it signed by the RSOF will be returned to both parties. Ony then can the transfer of materials occur.

Please do not transfer materials without waiting for approval from the RSOF. Call DOES (x2906) with any questions.

Radioisotope Inventory Report

The Radiation Inventory Report, attached to the Radiation Safety Information Memo sent to each Authorized User, contains information tailored specifically for your laboratory. It is important that you check all of the information listed on this form and make any necessary changes. The following is a break-down of each section and what you should look for when making changes.

• Laboratory Locations: Listed here are the rooms in which you are working and whether radioisotopes are used in each room. Make changes if you are no longer using a room or if it was surveyed by someone other than the person listed.

• Worker Name: Listed is each worker's name and whether he or she is authorized to use radioisotope. Let us know if anyone listed is no longer working in your lab. The date listed

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Fume Hood Testing

Chemical fume hood testing is now occurring on campus. Millis, the BRB, Morely, and the Biololgy building are completed, with the rest of the campus scheduled as follows:

Building	Test Date
Smith	early July
HG Wood	mid-July
Bingham	late July
Rockefeller	late July
Med School—East	early August
UCRC	mid August
Glennan	mid August
White	mid August
Olin	mid August
Wickenden	mid August
Dental School	late August
Pathology	late August
Wearn	early September
RB&C	early September
Bolwell	early September
Hanna Pavilion	early September
Kent Hale Smith	early September

Chemical fume hoods are tested annually, and a dated certification sticker is placed on each one. Please check when the fume hoods in your area are scheduled to be tested, and make sure all of them have an up-to-date certification sticker. If there are fume hoods in your area that were not tested when scheduled, inform Safety Services (x2907) as soon as possible.

Example of a certification sticker

Fume Hood Tips

Chemical fume hoods provide significant protection from exposure to hazardous materials during potentially dangerous operations. While primarily used as a ventilation device, fume hoods can also offer additional protection by placing a physical barrier between the worker and chemical reactions carried out within the hood when the sash is closed.

Although hoods are designed to exhaust all of the air within their confines, conditions of use can affect their containment capabilities. To preserve efficiency, certain conditions must be adhered to. Here are some tips to assure safe usage and to keep your fume hood working most efficiently:

• Before starting an experiment, make sure the exhaust blower is operating and air is entering the hood, using a tissue to verify that flow exists.
• Periodically check to make sure the air flow through the hood has not degraded—check the certification date sticker to verify when it was last checked, and contact DOES if the certification has expired.
• Avoid blocking baffle exhaust slots in any way.
• If paper is used to line the fume hood, take care to not obstruct air flow to the airfoils around the fume hood opening.
• If it is practical, elevating containers on stands inside the fume hood will improve air flow within the hood.
• Be aware of other room ventilation factors that may interfere with your hood operation such as open doors, open windows, blocked exhaust ports, or heating and air conditioning vents.
• Avoid cross drafts and disruptive air currents in front of the fume hood.
These can occur through repeated insertion and withdrawal of the workers' arms in and from the work chamber, opening and closing the

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Radioisotope Inventory Report

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beside each name gives the last training session attended by that worker. All lab personnel who work with radiation must be retrained yearly, so inform workers needing re-training of upcoming dates for radiation re-training sessions. This information can be found on page 2 of the DOES newsletter.

• Radioisotope Summary: Listed here are the nuclides your lab is authorized to use, the actual inventory of these nuclides, and the possession limit you are authorized to maintain.

The date listed reflects the inventory our records show your lab contains as of that date. Though there may be minor changes in the meantime, we cannot directly change the inventory listed—it is a subtotal of shipments minus decay, minus sewer disposal, and minus waste pickups. Upon request or during waste pickups, an Active Inventory Form can be supplied for your benefit to update the amounts in your laboratory.

• Radiation Monitor Equipment: The types of meters used for surveying your lab are listed, as well as their most recent calibration date. All meters must be calibrated yearly. Call the Radiation Safety Office if this needs done; we will calibrate them free of charge.

Any changes you indicated on the previous month's form should be reflected on your current form. If two or three months have gone by, however, without the necessary significant changes being shown, call the RSOF (x2906).

Glove Compatibility Chart

Below is an abbreviated chart showing some of the most commonly-used chemicals on campus and which glove is best for the job.

Chemical	Best Glove Choice
Acetone	latex, neoprene, or nitrile
Benzene	nitrile
Chloroform	nitrile
Chromic acid	vinyl
Diethyl ether	nitrile
Ethyl acetate	neoprene or nitrile
Formaldehyde	neoprene, nitrile, or vinyl
Hexane	neoprene
Hydrochloric acid	vinyl
Hydrofluoric acid	vinyl
Methylene chloride	nitrile
Nitric acid	vinyl
Perchloric acid	vinyl
Phenol	neoprene or vinyl
Potassium / sodium hydroxide	vinyl
Sulfuric acid	latex, neoprene, or vinyl
Toluene	nitrile

Gloves and Chemical Compatibility

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• Nitrile-Butadiene Rubber (NBR)—NBR gloves are marketed as SOL-VEX or Nitrile. These gloves work well with aromatic petroleum and chlorinated solvents. They are resistant to cuts, snags and punctures.

• Vinyl— Vinyls are popular in both disposable (thinner, examination-type gloves that allows precision in movement) and reuseable forms (made of polyvinylchloride, or PVC). The PVC glove is thicker and is necessary for use with corrosive materials. Where "vinyl" is listed on the glove compatibility chart, use the PVC reuseable gloves, not the thin disposables.

Call the Department of Occupational and Environmental Safety (x2907) if you have questions about a specific chemical.

Fume Hood Tips

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doors to the laboratory, improper placement of operation of materials or equipment within the work chamber, or rapid passage of co-workers past the cabinet. To avoid these problems, avoid rapid movements in and out of the hood and restrict traffic past the hood opening when it is in use.

• Never place your face inside the hood.

• Do not store chemicals or waste in the hood which can block the ventilation openings.

• Many new fume hoods are designed to adjust air flow with sash height. Therefore, close the fume hood sash whenever possible: this simple act improves the ability of the hood to contain fumes and reduces energy consumption by saving HVAC make-up air demand.

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