"Safety Comes First"

Case Western Reserve University Environmental Health and Safety

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The Importance of Laboratory Documentation

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The OSHA Laboratory and Bloodborne Standards define the regulatory requirements for safe use of chemicals and biologicals in our laboratories. However, in most cases, these standards do not dictate how safe practice should be accomplished. Instead, compliance with these Standards relies on the knowledge of the work to be done and the expertise of each individual laboratory PI/manager. The standard is performance-based and compliance is determined by achievement of safe practice in each individual laboratory. The central documents mandated by Case Western Reserve University for support of safe laboratory practice with chemicals and biologicals are the Chemical Hygiene and Exposure Control Plans, which contain individualized safety guidelines and procedures established by each Principal Investigator for his or her laboratory. Notably, these standards require that laboratory workers receive specific training in the procedures they will carry out in their laboratories. Laboratory Specific Training is not included in the general EHS training courses. It must be provided by the Primary Investigator and/or Lab Manager when new workers initially arrive in the laboratory or when new procedures are introduced that may affect the safety of all or some of the workers in specific laboratory programs.

In support of OSHA Safety programs, the Environmental Health and Safety Department (EHS) provides basic safety training initially upon employment and reviews the Chemical Hygiene and Exposure Control Plans of each laboratory for compliance with OSHA guidelines annually. Initial training is designed to communicate basic safety knowledge. Follow up review and

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Acrylamide Gel Disposal

"These gels must be…. disposed of as hazardous (chemical) waste or radioactive waste. "

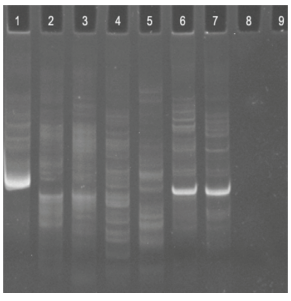
Acrylamide is often used for separation of protein and nucleic acids by electrophoresis and is a suspected carcinogen and a known neurotoxin. Polyacrylamide gels are commonly used in research throughout the University. Although polymerized acrylamide is not regulated as a hazardous waste, polyacrylamide gels often contain un-polymerized acrylamide which is a toxic material that can produce a hazard when introduced to the environment. Use the following guidelines when disposing of polyacrylamide gels. Do not dispose of polyacrylamide gels in the regular trash. These gels must be collected, and will be disposed of as hazardous (chemical) waste or radioactive waste.

Gels Loaded with Biologicals Only

Do not dispose of polyacrylamide gels in red bags as a biological waste.

Polyacrylamide gels containing non-viable proteins and nucleic acids must be placed into a leak-proof black, white or clear plastic bag. Seal the bag and place the sealed bag inside a cardboard box. Make sure the box is free from any markings and labels that do not correspond to the contents placed inside. An alternative to the bag/box method is to collect these gels in a 5-gallon plastic pail with a tight-fitting lid.

Whether using the bag/box method or the 5-gallon pail, these outer packaging must be properly marked with "Waste acrylamide gels". A properly filled out chemical waste tag must be affixed to the outer containers and a pink waste sheet filled out and returned to EHS for pick-up. Again, identify the waste as "Waste acrylamide gels" on the paper work. If the gels contain pathogenic proteins or nucleic acids (i.e. infectious whole prion proteins or infectious virus genomes), the biohazard must be eliminated first through proper decontamination (please, DO NOT autoclave gels). Once this pathogen has been eradicated, the gels can then be disposed of as a hazardous (chemical) waste.



Gels Loaded with Radioactive Materials

Environmental Health and Safety requests that all radioactive polyacrylamide gel waste also be collected separately from other waste streams. These gels should be placed in a radioactive bag and appropriately labeled with isotope and activity. The Radiation Safety Office will collect the gels after a waste pick

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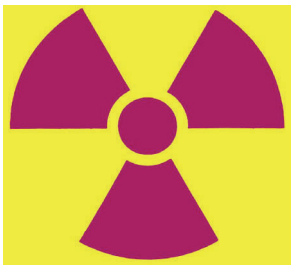
Dosimetry



A radiation dosimeter or badge does not protect the worker from radiation, but passively detects and measures radiation to which you have been exposed. The badge will detect high-energy beta, gamma or X-ray radiation. These dosimeters cannot detect low energy beta radiation from some isotopes, including C14, H3, or S35.

In order to minimize your exposure to radioactive materials or radiation-producing devices, always practice ALARA measures (minimize time near a source, maximize distance and shielding between you and the source).

CASE uses two badges for most employees:

- Luxel by Landauer (aluminum oxide dosimeter)
- TLDs (thermo-luminescent dosimeter).

The Luxel badge measures whole body dose from x–ray radiation, gamma radiation, and beta radiation.

The TLD measures extremity dose (finger, hands etc.) from x-ray, gamma radiation and high-energy beta radiation.

The TLD chip is housed in a plastic ring to be worn on your dominant hand on the most applicable digit.

All workers must attend radiation safety training prior to obtaining a radiation badge. Radiation workers who operate x-ray machines, fluoroscopy units, certain unsealed and sealed radioisotopes or are exposed to other sources of gamma or high energy beta radiation are generally required to wear one or more dosimeters.

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"All workers must attend radiation safety training prior to obtaining a radiation badge."

Compressed Gas Cylinder Safety

Compressed gases possess two separate hazards – mechanical and chemical. If the gas in the cylinder is flammable, fire or explosion is possible under certain conditions. Additional hazards can arise from the toxicity or reactivity of the gas. And since so much potential energy is created through the compression of the gas, a cylinder can become a potential rocket/missile.

Thus, careful procedures are necessary for handling and storing of compressed gas cylinders. Here are some tips to reduce their potential hazard.

"….a cylinder can become a potential rocket/ missile."

Cylinder Handling

1. Always use a hand truck for transport of compressed gas cylinders. Do not roll them!
2. The cylinder valve cap should always be firmly in place when the cylinder is moved.
3. All gas cylinders, whether full or empty, must be properly anchored by chain or belt in an upright position at all times. No more than two (2) gas cylinders should be chained or strapped together with one securing device.
4. Do not drop cylinders or permit them to fall against each other.
5. Leave valve caps on cylinders until secured and ready for use.
6. All valves should be closed when not in use.
7. Use the proper regulator for the particular gas.
8. Always consider cylinders to be full and handle accordingly.

Cylinders of non-liquefied gases should be considered empty while a little positive pressure (approx. 25 psig) still remains in the cylinder in order to prevent suck-back and contamination of the cylinder. Cylinders containing liquefied gases should never be completely emptied in order to prevent suck-back and contamination. The contents of cylinders must be identified with decals, stencils, glued or wired-on tags, or other markings on the cylinders. Color codes alone or tags hung around the necks of the cylinders are not acceptable. Cylinders lacking proper identification must not be accepted from vendors.

Employees must not attempt to repair cylinders or cylinder valves or to force

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Compressed Gas Cylinder Safety, cont.

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stuck or frozen cylinder valves.

Empty cylinders must be marked "EMPTY" with grease pencils. Generally, this marking should be on a large piece of adhesive or masking tape stuck on the cylinder rather than on the cylinder itself. However, some cylinders have tags wired to the valve that identify their contents; in this case, the bottom half of this tag may be torn off to indicate an empty cylinder. In all cases, empty cylinders must be easily identified so as not to be confused or stored with full cylinders.

"Empty cylinders must be marked 'EMPTY' with grease pencils."

Demurrage charges continue to apply until cylinders are returned to the supplier - Airgas; therefore, empty cylinders should be returned promptly. Furthermore, very old cylinders can form shock-sensitive peroxides - another reason to return cylinders as soon as they are empty.

If your lab has any compressed gas cylinders belonging to the old vendor Praxair, please inform EHS office immediately since all of Praxair gas cylinders must be return in order to avoid continuous demurrage charges.

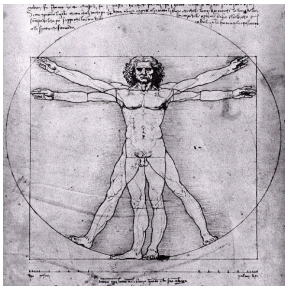
Cylinder Storage

1. Store compressed gas cylinders in a fire-resistant, cool, dry, and adequately ventilated area.
2. The storage area should not contain any sources of ignition.
3. Storage area temperature should not exceed 100 degrees Fahrenheit.
4. The floor should be level and designed to protect cylinders from dampness.
5. Cylinders should be protected from weather extremes and direct sunlight.
6. Store gases supporting combustion at least 25 feet from fuel gases, preferably in another storage area. For example, hydrogen gas cylinders and oxygen gas cylinders must never be stored near each other.

All researchers should know the characteristics of the gases they use: toxicity, flammability, compatibility with other materials and gases.

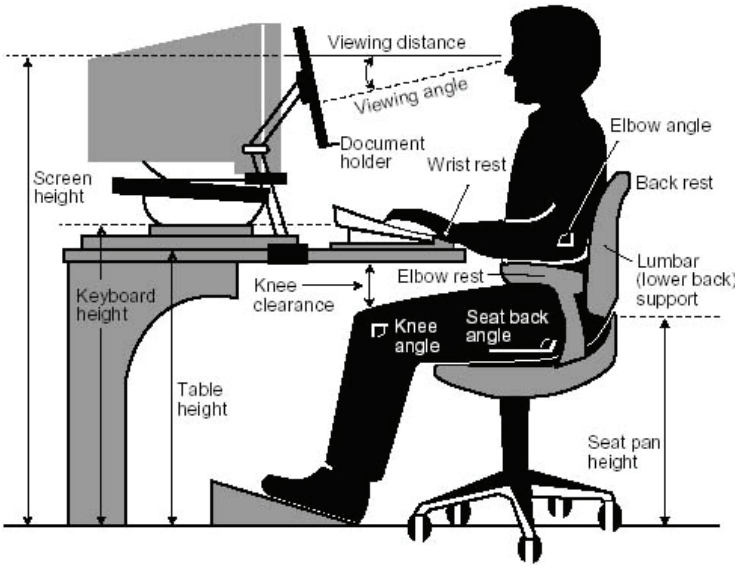
For more information on storage and handling of compressed gas cylinders, please see CWRU Laboratory Safety Manual (page 68) or call the EHS office at 216.368.2907.

Choosing The Right Ergonomic Office Chair



Working in an office typically involves spending a great deal of time sitting—a position that adds stress to the structures in the spine. Therefore, to avoid developing or compounding back problems, it's important to have an ergonomic office chair that supports the lower back and promotes good posture.

There are many types of ergonomic chairs available for use in the office. No one type is necessarily the best, but there are some things that are very important to look for in a good ergonomic office chair. These things will allow the individual user to make the chair work well for his or her specific needs.



"A seat height that ranges from about 16 to 21 inches off the floor should work for most people."

What features should a good ergonomic office chair possess?

In first considering the "conventional" style of office chair, there are a number of things an ergonomic chair should have, including:

- **Seat height**. Seat height should be easily adjustable. A pneumatic adjustment lever is the easiest way to do this. A seat height that ranges from about 16 to 21 inches off the floor should work for most people. This allows the user to have his or her feet flat on the floor, with thighs horizontal and arms even with the height of the desk.
- **Seat width and depth**. The seat should have enough width and depth to support any user comfortably. Usually 17-20 inches wide is the standard. The depth (from front to back of the seat) needs to be enough so that the user can sit with his or her back against the backrest of the ergonomic office chair while leaving approximately 2 to 4 inches between the back of the knees and the seat of the chair. The forward or backward tilt of the seat should be

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..Dosimetry, Cont.

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The following information provides general badging guidelines for those who handle radiation sources or equipment.

No badge is required when using:

H3, C14, P33, S35

A Whole Body Badge is required when working with:

P32, Cl36, I131, I125, Rb86, Na22, Cr51, XRD, Fluoroscopy, or a Particle Accelerator.

A Ring Badge is required for use with:

Greater than 0.5mCi of P32, Rb86, Na22, XRD, Fluoroscopy, or a Particle Accelerator.

New personnel working with radiation sources or Radiation Producing Equipment (XRD) must complete the Dose History Sheet during the Radiation Safety Class. Once Radiation Safety reviews the form, a dosimeter will be issued if needed.

.....Gel Disposal, Cont.

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up form has been submitted. If your laboratory currently has mixed waste in the laboratory, there is no need to separate it. Please arrange for a radioactive waste pick up as soon as possible and write "Waste acrylamide gels" in the description area on the waste pick up form. Once the mixed waste is out of your laboratory, please start separating the polyacrylamide gels from other dry waste.

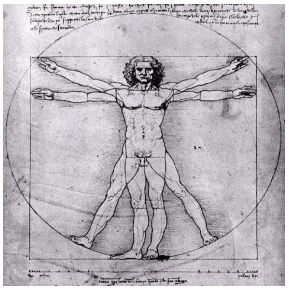
In review

- **Never dispose of polyacrylamide gels in the regular trash.**
- **Gels loaded with biologicals only must be disposed of as hazardous (chemical) waste.**
- **Gels loaded with a radioactive material must be disposed of as radioactive waste.**
- **Gels loaded with a mixed waste must have each hazard eliminated.**

As always, before attempting anything you are uncertain of, please check with a Safety Specialist in the EHS Office by calling 368-2906 or 368-2907.

"Never dispose of poly-acrylamide gels in the regular trash."

.....The Right Ergonomic Office Chair , cont.



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adjustable.

- **Lumbar support**. Lower back support in an ergonomic office chair is very important. The lumbar spine has an inward curve, and sitting for long periods without support for this curve tends to lead to slouching (which flattens the natural curve) and strains the structures in the lower spine. An ergonomic chair should have a lumbar adjustment (both height and depth) so each user can get the proper fit to support the inward curve of the lower back.

"Lower back support in an ergonomic office chair is very important."

- **Backrest**. The backrest of an ergonomic office chair should be 12 to 19 inches wide. If the backrest is separate from the seat, it should be adjustable in height and angle. It should be able to support the natural curve of the spine, again with special attention paid to proper support of the lumbar region. If the office chair has the seat and backrest together as one piece, the backrest should be adjustable in forward and back angles, with a locking mechanism to secure it from going too far backward once the user has determined the appropriate angle.
- **Seat material**. The material on the seat and back of the ergonomic office chair should have enough padding to be comfortable to sit on for extended periods of time. Having a cloth fabric that breathes is preferable to a harder surface.
- **Armrests**. Armrests should be adjustable. They should allow the user's arms to rest comfortably and shoulders to be relaxed. The elbows and lower arms should rest lightly, and the forearm should not be on the armrest while typing.
- **Swivel**. Any conventional style or ergonomic office chair should easily rotate so the user can reach different areas of his or her desk without straining.

Any questions concerning ergonomics can be addressed with an EHS ergonomist by calling 368-2907.

The Importance of Laboratory Documentation, cont.

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Marc Rubin

training is targeted to refreshing memory and delivering changes that OSHA may mandate or suggest from year to year (e.g. Note upcoming online course on the new OSHA Global Harmonized System as it rolls out over the next few years.). Laboratory Specific procedures must be contained in each laboratory's CHP and ECP and these documents must contain information sufficient for a worker to safely perform required tasks, and maintain a safe work environment for themselves and those around them.

Laboratory-specific Training provided by each laboratory must be documented. Supporting documentation that concisely describes training provided must be updated annually and include an attendance sheet signed annually and at times of critical procedural changes by each worker. These documents must accompany the laboratory CHP and ECP to demonstrate, upon inspection, that the information in the CHP and ECP was communicated to the laboratory staff. Communication assumes direct interaction with the PI and/or Laboratory Manager and is not fulfilled by assigning material to review without discussion with the involved workers. Without documentation, if injury or audit occurs, there is no way to prove that the requirement for Laboratory Specific Training was met and in force. Finally, OSHA Safety Plans MUST be available and up to date in each active laboratory. These required safety documents are not meant to be stowed outside of the laboratory on an investigator's office bookshelf.

As final notes, last month I noted two distracting flaws in documents kept in several laboratories. Many plans included example documents provided by EHS in their active Plan folders. This practice is both distracting and misleading. If you do not wish to use the template pages that EHS gives you as a guide please remove the blank pages and replace them with your own substitutes. Inclusion of example and unfilled irrelevant form pages makes good plans look incomplete. Further, I found that many plans were updated and sent to EHS but that the updated plans were not placed in the laboratories. Please don't mess up good work with bad housekeeping.

As always, EHS is happy to help you with OSHA mandated tasks if we can provide assistance. We have designed forms and other materials to assist you with your specific OSHA training and required documentation. This material and direct assistance at EHS is always available to help you design OSHA compliant individual laboratory and teaching laboratory programs.

"OSHA Safety Plans MUST be available and up to date in each active labora-tory."

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