

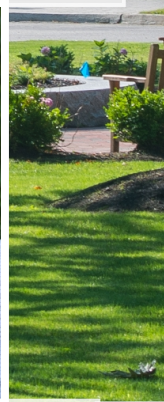
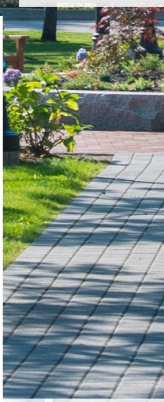
EHS Lab Chatter



CONTENTS

- Page 1.....Contents and Contact Us
- Page 2.....Safety Spotlight: Spring Lab Attire Reminder!
- Page 3.....UV Light Safety
- Page 4.....UV Light Safety continued
- Page 5.....UV Light Safety continued
- Page 6.....Proper Disposal of Empty Containers
- Page 7.....UNE Compliance Hotline
- Page 8.....Roadside Emergency Car Kits
- Page 9.....UNE Chemical Sharing Program

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Safety Spotlight:



Spring Lab Attire Reminder!

Spring is upon us again! As the spring and summer weather approaches, we need to pay close attention to proper lab attire for faculty, staff, students and volunteers. The following are required to enter UNE laboratories:

- ▶ Long pants (no shorts, skirts, capris, etc.)
- ▶ Closed shoes (no sandals, ballet flats, flip flops, etc.)
- ▶ Covered midriff (no shirts that expose the midriff)
- ▶ Long sleeves, lab coat or gown
- ▶ Long hair tied back
- ▶ Safety glasses and goggles (as needed depending on hazards present)

The only exception is Marine Science Center field labs where there are no hazards present (including chemical, biological or environmental). These labs will be handled at the discretion of the instructor based on the risks analyzed.

Instructors may ask any individual in any UNE laboratory to leave if they are not dressed safely and appropriately for lab activities or hazards that are present.

If you are taking spring/summer courses or doing research work, you should consider bringing a change of clothes and/or footwear for before or after you are in the lab. These policies are in place to protect your body from harm due to chemical, biological and environmental hazards. Even though the environment is changing outside by getting warmer, the lab environment does not get any less hazardous on the inside. Also, if you see something, say something. Help protect fellow lab workers by making sure everyone is following the lab attire policies.

If you have specific questions on the policies, feel free to contact your college's Chemical Hygiene Officer (CHO), Department Chair, or EHS staff to obtain clarification.



**Outfitted
for Safety**



UV Light Safety

by Ronnie Souza

What Are UV Trans-illuminators?

Ultraviolet (UV) trans-illuminators or UV light boxes are used in biotechnology for visualization of nucleic acids (DNA or RNA) after gel electrophoresis and ethidium bromide staining. Samples are placed on the illumination window and illuminated by UV light. The clear glass face allows the light to illuminate the gel, but also potentially exposes the user. To reduce the risk of injury, most models come equipped with a shield to filter excess light. For older models, various types of shields can be attached that provide equal protection. UV trans-illuminators operate at one of several wavelength bands, depending on the type of sample. Standard wavelength bands are 254, 312, and 365 nanometers (nm). Most of these instruments are stationary, but a few hand-held types carry the same hazards as those of the stationary models.

Equipment must be used for the purpose for which it was designed. For example, portable UV readers must not be used UV side up as mini-trans-illuminators for cutting gels

What Are UV Cross-Linkers?

An apparatus called a UV cross-linker is used to literally “cross-link” (to covalently attach nucleic acid to a surface or membrane following Southern blotting, Northern blotting, dot blotting, and colony/plaque lifts). Since the DNA will be used in place, a 254 nm wavelength is used to maximize adherence.

Hazard and Risks from Trans-Illuminator UV Radiation

It is important to note that the UV radiation used in trans-illuminators is harmful to both skin and eyes. UV radiation cannot be seen and is not felt immediately; the user may not realize the danger until after the exposure has caused damage. Symptoms typically occur 4 to 24 hours after exposure.

Most UV sources can emit a small amount of blue light, but this does not indicate anything about the amount of emitted UV. Unfortunately, the low intensity of visible light gives a false illusion that the intensity of UV radiation is low.

The effects on skin are of two types, acute and chronic. Acute effects appear within a few hours of exposure, while chronic effects are long-lasting and cumulative, and may not appear for years. An acute effect of UV radiation is redness of the skin called erythema (similar to sunburn). Chronic effects include accelerated skin aging and skin cancer.

UV radiation is absorbed in the outer layers of the eye – the cornea and conjunctiva. Acute overexposure leads to a painful temporary inflammation, mainly of the cornea, known as photokeratitis. Repeat overexposure to the UV is unlikely because of the pain involved. However, chronic exposure leads to an increased risk of certain types of ocular cataracts.

Working unprotected for even a few minutes can cause injury. It is possible to calculate acute threshold for acute effects and to set exposure limits. It is not possible, however, to calculate threshold for chronic effects; therefore, there is no exposure level that is safe. Exposure should be reduced as much as possible.

Hazard Substitution

It is always preferable to remove a hazard than to implement protective measures. Dyes are available that fluoresce in blue light, eliminating the ethidium bromide and, thus, the need to use UV. These dyes have the advantage that although filter glasses are generally worn to remove background light and enhance contrast, the UV hazard is no greater than that from any other bright visible light source. This alternative also eliminates the use of ethidium bromide, which is mutagenic, an irritant, and toxic by inhalation.

UV Light Safety continued...

Limiting UV Exposure

Consult the manufacturer's manuals for information about the potential exposure level and frequency of radiation, as well as for the suggested operating protocols. There are three types of control measures: engineering, administrative, and personal protective equipment.

Engineering Controls:

Location: UV-generating devices should be located in a separate room, alcove, or low-traffic area of a lab. To prevent exposure to other employees, avoid placing equipment in the vicinity of desk areas or other equipment.

Enclosure: The use of light-tight cabinets and enclosures is the preferred means of preventing exposure. Where it is not practicable to fully enclose the UV source, use screens, shields, and barriers.

UV trans-illuminators are often fitted with a plastic safety cover that provides partial shielding by filtering out some or all of the UV radiation. Trans-illuminators are often designed with a cover that is hinged at the front of the unit to partially shield the user at the same time as allowing the user to manipulate the sample. Covers or partial enclosures must not be removed when the equipment is in use. They should be replaced if discolored, degraded, or damaged in any way.

Interlocks: UV trans-illuminators should come with interlock devices. Interlocks must not be tampered with. They must be replaced or repaired when defective. Old trans-illuminators that are not interlocked should be disposed of and replaced with alternatives.

Administrative Controls: Typical administrative controls include limiting access, ensuring that people are aware of the potential hazards, and providing training and safe working instructions for users.

Training: Personnel should be trained in using the UV equipment safely. The manufacturer's manuals provide specific safety-related information (e.g., type of eye/skin protection needed, ventilation requirements) that must be completely understood before using the equipment. If any uncertainty or concern exists regarding the safe use of UV-generating equipment, contact the manufacturer for clarification.

Personnel should carefully study the manufacturer's manuals for the UV-generating equipment and be familiar with its use. It is important never to deviate from the instructions for safe operation without first contacting the manufacturer.

At a minimum, lab personnel should be familiar with the following when working with or around UV light:

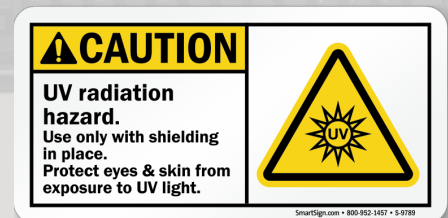
- UV light-producing equipment
- Warning signs and labels
- Protective equipment
- Symptoms of UV exposure

Minimizing exposure:

- ▶ Never view the UV lamp directly. Although the inverse square law applies to non-laser beam UVR, it is not advisable to look directly at any UV source) at any distance.
- ▶ Keep exposure time to a minimum, and where the source is not enclosed or shielded, keep as far away from it as practicable.
- ▶ Restrict access to those personnel who are directly concerned with the operation of the UV source.

Hazard warning signs:

Warning signs are necessary to inform about the risk of exposure during use and maintenance. Warning signs should be used where applicable to indicate the presence of potential UVR hazards, to restrict access, and to specify PPE.



UV light safety continued...

Personal Protective Equipment:

Face shield: UV-absorbing, full face shields should be worn in addition to safety glasses or goggles (goggles may not provide sufficient face protection). Severe skin burns can happen in a very short time, especially under the chin (which is often left exposed). **Full face shields are the only appropriate protection when working with UV light boxes for more than a few seconds.**

Gloves: At a minimum, wear nitrile, latex, or tightly woven fabric gloves to protect against the significant amounts of UV-A and UV-B that may pass through to the skin; these types of gloves have a low transmission of UV compared to vinyl gloves. Gloves should protect personnel from UV light, as well as from the hazard of the activity being performed.

Lab coat: Wear a lab coat that fastens securely at the wrists and up the neck so that no skin is exposed. Note that burns to uncovered wrists and the neck are not uncommon.

Please note: Tyvek® protective wear, such as arm shields, coveralls, and lab coats, is NOT appropriate PPE because it may allow significant leakage of UV through it.

PPE must be either readily available and cleaned between users or personally allocated to each user. Eye and face protection must be inspected either regularly or before each use for damage or defects such as cracks, crazing, or bleaching, and replaced when necessary. Note that PPE may need to serve multiple purposes, such as protecting against both chemical splashes and UV.

Take-Away Safety Tips:

- NEVER use a trans-illuminator without its protective shield in place.
- NEVER tamper with or bypass the interlocks.
- NEVER use a UV crosslinker that does not have a door safety interlock.
- NEVER use a bioimaging system with a trans-illuminator within a drawer, with the drawer in the open position.
- ALWAYS use appropriate PPE for the hazard: UV face shield, goggles, gloves, buttoned-up lab coat.
- ALWAYS keep shields clean, and replace if damaged.

Examples of Engineering Controls:



Trans-illuminator with hinged shield.



Trans-illuminator with photo curtain.



Bio imaging system with trans-illuminator drawer.

Examples of PPE:



UV Face Shields



UV Glasses



UV Gloves

Proper Disposal of Empty Containers

By Peter Nagle

Do you know how to dispose empty chemical containers? Most people would define empty as the point in which no more liquid or solid can be poured out of a container. This may be true from a practical viewpoint, but in the regulatory world it may not be accurate.

There are three legal definitions of empty that affect hazardous waste management: DEP non-acute, DEP acute and Department of Transportation (DOT) empty.

DEP Empty for Non-Acute waste

- All contents have been removed using “commonly employed practices” from that type of container.
- No more than one inch of residue containing no free liquids remains in the bottom of the container.
- The container has been triple rinsed using a solvent capable of removing the product.
- No more than 3% of the total by weight of the total capacity of the container remains if the container is less than or equal to 119 gallons in size.

If the container meets the above conditions, then it is not regulated as hazardous waste.

DEP Empty for Acute Waste*

The DEP has a second standard for acute wastes in which all containers must be triple rinsed before discarding and the rinsate disposed as hazardous waste. In this case, EHS would prefer to dispose of the empty container during one of our quarterly lab packs. We have few materials at UNE that would require triple rinsing.

***Acute wastes** are wastes found to be either lethal or highly toxic to humans in low doses or in the absence of human data found to be lethal in rats in low concentrations. The DEP refers to the EPA list of acute wastes.

DOT Empty

A more stringent standard must be met before discarding an empty container in the general trash: the DOT definition of empty. The DOT does not consider quantity of material in its definition of empty, only chemical properties. It doesn't matter if the container is full or has less than an inch of product left in it. If there is a hazardous product left in the container, then the hazard still exists; and therefore, it must still be handled and shipped as a hazardous material.

To discard of empty containers in the general trash, we must follow the DOT definition of empty.

Guidelines for Disposal of Empty Containers in General Trash:

- Empty all contents until no more liquid can be poured out (no drips).
- “Empty” flammable solvent containers must be set aside in a chemical fume hood in order to allow any residual fumes to evaporate. The container must be dry and free of fumes.
- Remove, or if not possible, deface all labels before the container is disposed.
- Remove all lids before discarding.
- Discard empty glass containers in a broken glass box
- Discard pails and plastic containers in dumpster



If you cannot remove all liquids or solids from a container please contact EHS for proper disposal. A container that may be no longer regulated as hazardous waste still may not be “empty enough” for the general trash. **If you have any questions, you can always contact EHS for assistance.**

If you have a use for an empty container we strongly encourage re-use as long as *the new material is compatible with the original contents*. Use good judgment as residue from the original product may be left in the container and could cause a reaction if the new material is incompatible.

UNE EMPLOYEE COMPLIANCE **HOTLINE**

CALL TOLL-FREE

1-866-587-6636

Open 24 Hours, 365 Days a Year

If you are aware of a potential violation of federal, state or regional regulations at UNE, you should report this information to your immediate supervisor right away.

If no action is taken to address the issue in a reasonable amount of time, or if you fear retribution may result from reporting the issue, you may call the UNE COMPLIANCE HOTLINE to report your concern.

Contact the hotline's 24/7 message service at any time. Your call will remain confidential to the extent permitted by law.

Please also feel free to call John Tumiel, UNE chief compliance officer, weekdays at (207) 221-4627.

For more information, please visit the UNE compliance website at www.une.edu/compliance and follow the HOTLINE link.



INNOVATION FOR A HEALTHIER PLANET

Roadside Emergency Car Kits

by Jessica Tyre

Spring and summer are very popular times to travel on the roadway. Whether you are traveling for business or pleasure you should always be prepared. Creating an emergency roadside car kit can be very helpful in those tough situations that can make traveling a challenge. These kits are easy to create and maintain. You will be happy you have one should you need it! Here is a list of generic items that every kit should have:

- ▶ Jumper cables. Or you can carry a small, portable, lithium-ion battery with jumper cables. Usually, these batteries will also recharge computers and cell phones. Prices for these batteries range from \$60-\$120. If you go the battery route, though, make sure to keep it charged.
- ▶ Flares or triangle reflectors. LED flares are also an option worth considering.
- ▶ A quart or more of motor oil
- ▶ A gallon of coolant
- ▶ First-aid kit
- ▶ Blanket or space blanket
- ▶ Flashlight and extra batteries
- ▶ Tool kit with screwdrivers, pliers, adjustable wrench, pocket knife
- ▶ A can of tire inflator and sealant such as Fix-a-Flat
- ▶ Tire pressure gauge
- ▶ Paper towels
- ▶ Spray bottle with washer fluid
- ▶ Ice scraper
- ▶ Pen and paper
- ▶ Granola or energy bars
- ▶ Bottled water

(This list is courtesy of Edmunds.com)



Other *optional* items you may want to consider having on hand depending on who you are traveling with and how far you are traveling could include:

- ▶ Pet bowls and food (if traveling with pets)
- ▶ Some type of wet wipes or baby wipes (spring/summer/fall only; will freeze in winter)
- ▶ A tarp
- ▶ Bungee cords
- ▶ Duct tape
- ▶ Extra light bulbs for your headlights (buy proper type depending on your make/model of vehicle)
- ▶ Spare wiper blades
- ▶ Spare batteries for your electronic key fob (if applicable; see owners manual for battery type)
- ▶ Utility gloves
- ▶ Phone charger for the car
- ▶ Extra jacket or sweatshirt (cold months); extra t-shirt (summer months)
- ▶ Towel(s) or rags
- ▶ Fire extinguisher
- ▶ Rain poncho

If you are creating your own kit then you can customize it any way you see fit. There are plenty of pre-filled kits out there on the market for purchase as well. Make sure items that are perishable or contain expiration dates are switched out on a regular basis so they will still be useful when you need them!

UNE Chemical Sharing Program

The UNE Chemical Sharing Program is a great way to reduce hazardous waste, reduce costs for your department, and have a positive environmental impact on campus. If you have any commonly used lab chemicals 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.

To contribute a topic or article to EHS Lab Chatter,
email: jtyre@une.edu



Have an amazing summer!

We will see you in the Fall!
Stay Safe!

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