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EH&S Fact Sheet
Environment, Health and Safety Information for the Berkeley Campus

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Electrophoresis Equipment: Guidelines for Safe Use

Electrophoresis units present electrical, chemical, and radiological hazards. All of these hazards need to be addressed before using the units. The Office of Environment, Health & Safety (EH&S) has prepared these guidelines and the accompanying checklist to assist researchers in safely operating electrophoresis units.

Proper equipment setup

Place electrophoresis units and their power supplies so that the on/off switch is easy to reach and the power-indicator lights are easily seen. Locate the equipment where it will not be easy to knock over or trip on.

Because electrophoresis work involves handling conductive liquids around electricity, power supplies should be protected by ground fault circuit interrupters (GFCIs). GFCIs act as very sensitive circuit breakers and, in the event of a short circuit, will stop the power before it can hurt a person. You can identify GFCIs by their "test" and "reset" buttons. They are found on some outlets or breaker boxes. An adapter type, which plugs into a standard outlet and does not require installation by an electrician, can be purchased at local hardware stores at prices starting at $10.

Addressing electrical hazards

Electrophoresis units use very high voltage (approximately 2000 volts) and potentially hazardous current (80 milliamps or more). This high power output has the potential to cause a fatal electrical shock if not properly handled.

Routinely inspect electrophoresis units and their power supplies to ensure that they are working properly. Power supplies should be inspected to ensure that all switches and lights are in proper working condition, that power cords and leads are undamaged and properly insulated, and that "Danger—High Voltage" warning signs are in place on the power supply and buffer tanks.

Inspect the buffer tanks for cracks or leaks, exposed connectors, or missing covers. If your units have such hazards, replace the units with new models that have these safety features built in, or contact EH&S for information on individuals approved to perform retrofitting.

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Chemical and radiological hazards

As with all research involving hazardous chemicals, laboratory personnel need to be familiar with any associated chemical and radiological hazards. Each laboratory must complete and post a UC Berkeley Chemical Hygiene Plan (CHP) flip chart and instruct laboratory users on its contents. The CHP flip chart has been developed to provide information on hazards, measures for controlling exposures, special precautions needed while working in the laboratory, emergency procedures, and additional resource information to help keep researchers safe. You can obtain a flip chart by calling EH&S at 642-3073. Laboratories that use radioactive materials must also obtain a Radiation Use Authorization and have their staff complete the associated training.

Training and work procedures

Principal investigators are responsible for providing instruction on the safe use of electrophoresis units to those in the laboratory who work with them. The instruction should cover the operating procedures written by the manufacturer or laboratory, as well as the associated hazards, the correct personal protective equipment, and applicable emergency procedures. As with all safety training, this instruction should be documented.

Employees must wear all appropriate personal protective equipment when working with electrophoresis units, including lab coats, gloves, and eye protection.

Do not leave electrophoresis units unattended for long periods of time since unauthorized persons may accidentally come in contact with the unit, or the buffer tank liquid may evaporate, risking a fire.

Laboratories that perform electrophoresis work during off hours should consider using a "buddy system" to ensure that emergency services can be notified if someone is injured or exposed. It is also recommended that laboratory personnel be trained in CPR and in First Aid.

Electrophoresis safety checklist

The attached Electrophoresis Safety Checklist, can be used by laboratory personnel, principal investigators, department safety coordinators, or safety committees to determine whether the electrophoresis units and their power supplies are set up properly and are in safe working condition. Any hazards that are found must be addressed and the corrective actions documented. The equipment should not be used until all hazards have been safeguarded. Completed checklists noting corrective actions taken should be kept on file, and copies routed to the department's Safety Committee for review.

Additional resources

For additional information, please contact EH&S (642-3073).

University of California, Berkeley

ELECTROPHORESIS SAFETY CHECKLIST

This form is to be used by researchers and other personnel involved in electrophoresis work to help ensure that the equipment and procedures are safe for use. The completed form should be discussed in lab groups and safety committees, and retained by the department.

Name of PI:_____ Department: _____

Building:_____ Room #: _____

Checklist Completed by: _____ Date: _____

ADMINISTRATION AND TRAINING ISSUES

	YES	NO	N/A
1. Is there an available manual or written procedure describing how to safely use the equipment?	____	____	____
2. Is instruction in the written procedure documented?	____	____	____
3. Is the chemical hygiene plan (with emergency numbers) posted in the lab?	____	____	____
4. Has training been provided and documented on associated chemical and electrical hazards?	____	____	____

EQUIPMENT DESIGN

	YES	NO	N/A
5. Is the power supply marked "DANGER - HIGH VOLTAGE"?	____	____	____
6. Is the electrophoresis unit marked "DANGER - HIGH VOLTAGE"?	____	____	____
7. Is the "ON" indicator light on the power supply working?	____	____	____
8. Is the voltage indicator on the power supply working?	____	____	____
9. Are all electrical contacts guarded?	____	____	____
10. Are all power leads insulated and undamaged?	____	____	____
11. Is the power supply electrical cord undamaged?	____	____	____
12. Does the power supply have a grounded 3-pin plug?	____	____	____
13. Is the power supply plugged into a properly grounded outlet?	____	____	____
14. Is there a ground-fault circuit interrupter (GFCI) in the circuit?	____	____	____
15. Does the electrophoresis unit have interlocking safety covers?	____	____	____
16. Is the power supply used as designed (with no "piggybacking" of electrophoresis units)?	____	____	____

EQUIPMENT SETUP AND PERSONAL PROTECTIVE EQUIPMENT

	YES	NO	N/A
17. Are power and voltage indicators clearly visible from the workstation?	____	____	____
18. Is the electrophoresis unit checked on a regular basis for adequate fluid level?	____	____	____
19. Is the power supply "ON/OFF" switch readily accessible?	____	____	____
20. Is the electrophoresis unit exterior dry with no spilled liquids?	____	____	____
21. Are the electrophoresis units and power supply placed so as not to create another hazard? (e.g., reaching over energized units, leads crossing aisleways, easily knocked over, etc.)	____	____	____
22. Do users wear eye protection, impermeable gloves, and lab coats?	____	____	____

ADDITIONAL RECOMMENDED LABORATORY PRACTICES

- Use of a "buddy system" for staff working in the laboratory
- Providing CPR training for laboratory staff

For each item marked "NO" above, list the needed corrective actions, a responsible person, and a correction due date. The unit should not be used until all hazards are safeguarded. Corrective actions should be documented here when complete.

_____

_____

For additional information, contact the Office of Environment, Health & Safety (642-3073).