UCR Environmental Health & Safety

SPOTLIGHT ON SAFETY

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Microtome and Cryostat Safety

Left to Right: Rotary, Sliding and Freezing (Cryostat) microtomes and foot treadle guard

Background

Microtomes (manual, semiautomatic, and automatic) are devices that are used to cut tissues into extremely thin sections. There are several types of microtomes available. The most commonly use microtomes are rotary, sliding, and freezing (Cryostat). Microtomes can present a sharp hazard, freezing hazard, and expose personnel to infectious agents if not used properly.

Regulations

California/OSHA Standard 3558 applies to microtome usage. The standard covers safe use, training requirements of operators, and proper adjustment, removal, replacement, or maintenance activities involved with microtomes and cryostats. For more information, visit https://www.dir.ca.gov/title8/3558.html

Best Practices

- Understand your microtome. Read and follow the manufacturer's recommendations for safe use.
- Ensure users receive training. *It' the law and for your safety*. Training must be completed prior to use and documentation of training must be kept for 3 years. Equipment-specific training should include the following topics:
    - Blade hazards, sharp safety, and injury prevention
    - Proper placement, use, removal, cleaning, and disposal of the blades
    - Appropriate personal protective equipment (PPE)
    - Other potential hazards associated with the material being handled
    - Ergonomics
    - Incident/injury response and reporting
- Determine your sample hazards. Samples may have biological hazards (infectious/non-infectious, fixed/unfixed tissues) and/or chemical hazards (fixatives and preservatives). Consult with UCR Industrial Hygienist (email: ehsih@ucr.edu) if there is a risk of inhalation exposure through aerosols.

During Operation

- Wear proper PPE. At minimum, long pants or equivalent, closed toe/heel shoes, lab coat, safety glasses or goggles, and gloves.
- Blades and samples should be handled with appropriate tools such as forceps to minimize injury risk. Consider using wire mesh, cut-resistant, or cryogenic gloves in addition to standard gloves when handling blades or frozen materials.
- Use forceps or tongs to remove tissue sections.
- Ensure blade lock is engaged when blade is on the blade holder.
- Blade guard must be used when blade is present when microtome is not in use.
- Arm (wheel) lock must be engaged when the rotary arm is not active.
- Be aware that the metal parts in cryostats can get very cold and present a freezing hazard. Do NOT touch metal parts with unprotected hands.
- Ensure a sharps container and proper waste containers are accessible.
- Maintain a minimum clearance between user's hands and any moving parts or blade.
- If applicable, when operating microtomes, the foot pedal must be positioned appropriately to avoid accidental activation.
- When not in use, the foot treadle of electrically-powered microtomes must be guarded by a cover/guard that will prevent unintended/accidental operation.

Cleaning, Repair, and Maintenance

- Always clean the equipment at end of each session and between uses of different materials.
- Use proper disinfectant (10% bleach followed by 70% alcohol if working with infectious materials including bloodborne pathogens).
- Use forceps to remove residue from the interior of the microtome.
- Use forceps or wear utility, wire mesh, or cut-resistant gloves while handling, removing, inserting, or decontaminating the blades.
- Store the blades in blade boxes. The blade should only be on the microtome when it is in use.
- If bringing in outside vendors for repair and maintenance, ensure that the microtome is properly decontaminated with appropriate disinfectant(s) BEFORE the vendor arrives.

References

California/OSHA Standard 3358
https://www.dir.ca.gov/title8/3558.html

UC Irvine Safety Moment: Microtome and Cryostat Safety
https://ehs.uci.edu/safety/pdfs/microtome-and-cryostat-safety.pdf

UC Davis SafetyNet 146: Microtome Use Hazards and Precautions
https://safetyservices.ucdavis.edu/safetynet/microtome-use-hazards-and-precautions

Resources

Examples of vendors selling cut-resistant gloves. Choose gloves that provide high cut protection balanced with dexterity and tactile sensitivity.
https://www.fishersci.com/shop/products/pip-kut-gard-dyneema-cut-resistant-gloves-cut-level-5/p-4891786
https://www.grainger.com/category/safety/hand-arm-protection/safety-gloves/cut-resistant-gloves

Microtome/Cryostat Training Template & Acknowledgement Form

Laboratory Building & Room Number:

Principal Investigator or Responsible Person:

Equipment Manufacturer Name and Model Number:

☐ **Manufacturer User Manual Provided** **or** ☐ **Available online at the following web address:**

Minimum personal protective equipment are long pants or equivalent that covers the entire leg, closed toe and heel shoes, laboratory lab coat, safety glasses or goggles, and gloves. As appropriate, additional PPE include:

Other potential hazards associated with the material being handled include:

- ☐ **Biohazardous materials**
- ☐ **Chemical hazards**
- ☐ **Cryogenic/freezing hazard**
- ☐ **Other:**

Incident Response

SHARPS INJURY – Wash the wound with soap and water for 15 minutes. If the wound is bleeding, cover with sterile gauze after washing. Notify supervisor immediately. Seek medical treatment if necessary. Report the incident to EH&S as soon as possible.

MUCOUS MEMBRANE – Flush area with water for 15 minutes. Eye exposures require use of an emergency eyewash for 15 minutes. If possible, call out for help to have another person assist you in finding and using the eyewash. Immediately seek medical assistance. Notify supervisor and EH&S as soon as possible.

AEROSOL – Notify others and leave the area immediately if hazardous aerosols may still be present. Wait at least 30 minutes before returning. Post signage to prevent others from entering. Seek medical attention if necessary. Notify supervisor and EH&S as soon as possible.

I have reviewed the equipment manufacturer's user manual with recommendations and procedures for safe operation of the listed equipment. I understand the contents of the training and will abide by all safety procedures and requirements.

_____	_____	_____
Name (print)	Signature	Date