

Microtomes and cryostats are mainstay instruments used in labs to section tissue. They serve the same function and share many of the same physical hazards. Cryostats are used in laboratories for frozen tissue sectioning. Microtomes are used to section tissues (with a fixative¹) embedded in a paraffin section at room temperature.

The Principal Investigator is responsible for ensuring that all lab personnel operating the cryostat and/or microtome have received adequate training and have demonstrated proficiency. Furthermore, training shall be documented and training records shall be retained by the PI. The USC Office of Environmental Health and Safety (EH&S) Team and/or Cal-OSHA may request to see training records and the written SOP at any time.

Refer to Cal/OSHA Standard 3558 for regulations on microtome and cryostat usage. The standard covers safe use, training requirements of operators, and proper adjustment, removal, replacement, and maintenance activities. Visit the <https://www.dir.ca.gov/title8/3558.html> web page for more information.

HAZARDS

The following hazards accompany use of this equipment:

- Sharps. Caution is advised due to blade presence.
- Biological (infectious/recombinant materials) agents. Treat all cryostat cold chambers and microtome work areas as biologically contaminated until properly disinfected.
- Ergonomic. Fatigue is known to occur when performing repetitive actions using the equipment.
- Cryogenic hazards during cryostat use, including the cleaning process. Potential for frostbite. Direct users to review EH&S' [Cryogenics and Dry Ice SOP](#) and the [Cryogen Safety Fact Sheet](#).



HAZARD MITIGATION

- All blade manipulations must be done mechanically.
- Due to limited dexterity with many thick cut-resistant gloves, it is recommended to have thin cut-resistant gloves (e.g. MedArmor™, Ansell™ Gammex™, Spec-Tec™ M104) under chemical-resistant gloves (e.g. disposable nitrile). NOTE: The thin cut-resistant gloves may be re-used as long as the integrity is not compromised.
- Have a lab-specific SOP available to train users on proper mechanical techniques.
- Keep blade covered/unmounted until sectioning. Do not keep used blades uncovered on or around the microtome/cryostat area. Dispose of immediately.
- Close the sliding window while sectioning.
- Breaks are recommended to avoid ergonomic fatigue.
- Never use fingers to sweep chamber surfaces.
- Never lay a blade with cutting edge up on a surface.
- Never try to catch a blade that is falling.
- Lock the handwheel and ensure blade is protected by the blade guard before handling the specimen or blade, changing the specimen, or taking a break.
- If the blade becomes lodged under the blade holder, use forceps/pliers (or a similar instrument) to remove it from the blade holder.
- Always use a brush to clean the blade.
- Secure/lock handwheel and blade before leaving.
- *Cryostat*. If specialized cryostat accessories are present (e.g., integrated vacuum for the frozen cutting media shavings), lab personnel will need additional training.
- *Microtome*. wherever applicable, the foot pedal must be positioned to avoid accidental activation during operation. Moreover, the foot pedal of each electrically powered microtome must be guarded by a cover or guard that will prevent unintended operation.

RESOURCES

[Cal/OSHA Standard 3558](#)

[Cryogenics and Dry Ice SOP](#)

[Cryogen Safety Fact Sheet](#)

¹Tissues with a fixative may reduce potential exposure and risk to the user.