Microtome Use Hazards and Precautions

SafetyNet #: 146

A microtome is a device that cuts extremely thin sections of tissue for microscopic study. They can be operated manually, semi-automatically or automatically. Although several types of microtomes are available for special purposes (e.g. retracting for plastic and vibrating for tissues that cannot be frozen or embedded), the rotary, sliding, and clinical freezing microtomes are most frequently encountered in histopathology labs. The ultramicrotome, used for cutting 0.5 µm plastic sections for light microscopic orientation and 90 nm sectioning for electron microscopy, is a retracting microtome.

Microtomes can present a hazard when the sharp blades are left uncovered and appropriate safety controls are not employed. Microtomes must be used, operated, and maintained by qualified persons in accordance with the manufacturer’s recommendations and Cal/OSHA standard 3558 [1] as summarized below. Operators must be trained on the safe and proper use of microtomes and on the equipment-specific operation prior to initial use and whenever a new process or new hazard is identified. This SafetyNet can serve as general microtome safety training, but microtome users must also get microtome and procedure specific training. The training can be in the form of a written Standard Operating Procedure. Training must be documented and training records must be retained for at least three years.

During operation, utilize the following safety procedures:
- The **blade lock** should always be engaged unless actively manipulating the blade (the blade lock secures the blade on the holder)

- Whenever a blade is present on the holder and when the microtome is not in active use, the **blade guard** must be used; contact equipment vendor regarding specific guarding issues

- Whenever the rotary arm is not in active use, the **arm (wheel) lock** must be engaged

- The blade should be installed and removed with the aid of a clamping tool such as a pair of hemostats

- When placing or retrieving materials near the blade, use appropriate tools (such as forceps or fine-tipped paint brush) so that hands remain in the clear of the blade

- A minimum clearance of 1 inch must be maintained between the operator’s hands and the blade (point of operation)

- The foot pedal of an electrically powered microtome must be guarded by a cover or guard that will prevent unintended operation. In addition, wherever applicable, the foot pedal must be positioned to avoid accidental activation during operation.

- Operators must use equipment-specific tagout procedures when performing maintenance on electrically-powered microtomes, to avoid accidental release of hazardous energy. Blades must be removed during maintenance and cleaning.

- Be aware of potential freezing hazards associated with cryostats (freezing microtomes). Metal parts can get as cold as -50°C. Do not touch metal pieces with bare hands.

- Place disposable blades in sharps container for disposal.

- In the case of ultramicrotomes, care should be exercised when working with diamond blades or glass knives.

- Place re-usable microtome blades into their blade boxes when not in use. The blade should only be on the microtome when it is in use. Never leave the blade unattended when it is in the microtome.

**Equipment-Specific training should include the following topics:**

- Blade hazards and injury prevention;

- Proper placement, use, removal, cleaning and disposal of the blades;

- Appropriate personal protective equipment;

- Ergonomics;

- Incident/injury response and reporting; and

- Other potential hazards associated with the material being handled.

**References/Resources**

- [Cal/OSHA regulation on Microtomes](#) [1]
Examples of foot pedal guards [2]


**Contact**

**Health and Safety**

healthandsafety@ucdavis.edu 530-752-1493
FAX: 530-752-4527

**More information**


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**Source URL (modified on 05/09/17 08:57am):** https://safetyservices.ucdavis.edu/safetynet/microtome-use-hazards-and-precautions

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