ENVIRONMENTAL HEALTH AND SAFETY
University of Nebraska-Lincoln

Safe Operating Procedure

(Revised 11/22)

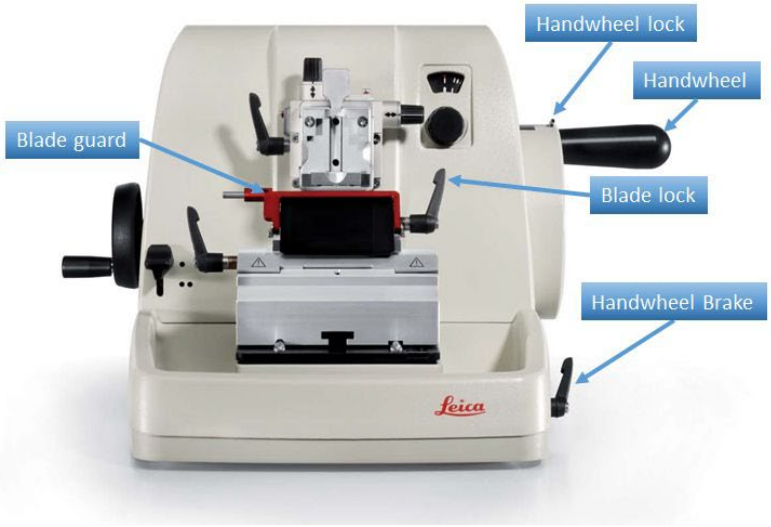
MICROTOME SAFETY

Overview and Considerations

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.

Operators need specific hands-on, equipment-specific training from their supervisor before using a microtome. Training topics should include:

- Blade hazards and injury prevention
- Proper placement, use, removal, cleaning and disposal of the blades
- Appropriate PPE
- Potential hazards associated with the material being handled



Because of the associated hazards, safety must be incorporated into every step of the process to keep fingers and hands protected. Always read and adhere to the manufacturer's operating instructions and precautions. Follow the safety tips provided below to avoid injuries and prevent exposure to chemical and biological hazards.

- 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 (handwheel) 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. Follow the manufacturer's installation/removal instructions explicitly.
- Knives can cut through your shoes if dropped. Be careful where your feet are positioned when installing or removing blades.
- Store blades in a covered container. Use a container that has guides to hold the blades rigid. Never leave blades on countertops. Lacerations can occur when reaching across the countertop and inadvertently contacting an unprotected blade.
- Disposable blades should be placed in a sharps container.
- When setting up the microtome, position the sample first then put in the blade. **Never** the other way around.
- When applying the brake, ensure that it is tight. Most accidents occur when the brake slips and the operator's hand is drawn into the blade.
- When leaving the microtome, even for a short time, ensure that the **blade guard** is in place.
- When preparing a paraffin sample for the Microtome, remember to clamp the sample down tight. The movement allowed by a loose clamp increases your risks of cuts.
- 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.

Never retrieve samples or debris from the microtome using your hands. ALWAYS use forceps or other appropriate tool(s).

- To avoid compression or knife marks, ensure that your blade is clean. Follow the manufacturer's guidelines for cleaning. A high-density polystyrene rod can be used to clean the blade, freeing your hands from potential contact.
- 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.
- Prions are not deactivated by the standard microtome preparation steps. You must wear gloves and use appropriate decontamination procedures when samples may contain prions.