




HAZARD MANAGEMENT – SAFE OPERATING PROCEDURE (SOP)

Only to be completed where required as a control measure under a Risk Assessment

NAME OF THE TASK/ACTIVITY	LEICA ROTARY MICROTOMES RM2135 AND RM2265	DATE: 13/02/2020
LOCATION	ADELAIDE MICROSCOPY WAITE FACILITY BUILDING 19 ROOM G10	Insert photo (Optional)
RISK ASSESSMENT (RA) NAME	Leica Rotary Microtomes_RA_Waite	
Residual risk rating on the RA	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High <input type="checkbox"/> Very High	
Hazards identified on the RA	Risk of lacerations from blades or glass knives Risk of needle stick injury if using needles Risk of inhaling resin dust when trimming Risk of eye injury when trimming Contact with electricity or potential for electric shock	
PERSONAL PROTECTIVE EQUIPMENT		
	Eye protection: <input checked="" type="checkbox"/> Safety glasses <input type="checkbox"/> Eye shields <input type="checkbox"/> Safety goggles <input type="checkbox"/> Other:	
	<input checked="" type="checkbox"/> Enclosed footwear: <input type="checkbox"/> Footwear that is resistant to spills of hazardous substances <input type="checkbox"/> Boots with steel caps <input type="checkbox"/> Other:	
	Protective clothing: <input checked="" type="checkbox"/> Lab coat <input type="checkbox"/> Gown <input type="checkbox"/> Long sleeves <input type="checkbox"/> Long pants <input type="checkbox"/> High visibility <input type="checkbox"/> Helmet <input type="checkbox"/> Sun protection <input type="checkbox"/> Other:	
DESCRIBE, IN SEQUENCE, STEPS TO COMPLETE THE ACTIVITY SAFELY		
Pre-operational checks		
YOU MUST NOT USE THIS MACHINE UNTIL YOU HAVE HAD APPROPRIATE TRAINING BY TRAINED ADELAIDE MICROSCOPY STAFF. Unauthorised use may result in damage to the instrument.		
Operational checks/steps to complete the activity from start to finish (including transport and waste disposal where relevant)		
General		
Rotary microtomes are a standard technology for precision sectioning of biological and other materials.		
The Leica rotary microtome model RM2135 is a precision instrument designed to cut paraffin sections for microscopic examination, with the aid of an attached disposable steel blade/knife. The RM2135 model has no electrical parts.		
The Leica rotary microtome model RM2265 is designed to cut either paraffin or resin sections for microscopic examination, with either disposable steel blades or glass knives. The RM2265 is powered by electricity.		
Microtome blades have an extremely sharp cutting edge, present a potential hazard for personal injury, and should be handled with care at all times. The steel blades currently used in these instruments are single-edge steel Feather brand. The glass knives are made by Adelaide Microscopy staff in house, from glass strips using a Reichert (Leica) glass knife maker (refer to Glass Knifemaker safe operating procedure).		
Risk Control Measures		
Engineering:		
There are 2 brakes to prevent accidental movement of the specimen over the knife. The hand-wheel brake can be used when the instrument is left for any reason. A main brake over-rides all movement of the microtome.		
There is a knife guard on the steel knife holder that can be swung into place to reduce the risk of injury.		
Administration:		
Only trained users may use the rotary microtomes. Users must be trained by an experienced Adelaide Microscopy staff.		
Only authorized and qualified service personnel may access the internal components of the instrument for service and repair.		
Read the Instruction manual for the relevant model.		

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Users must refer to the Sharps SOP prior to using steel blades, glass knives, double edge blades and needles, or before snapping double-edged blades in half for trimming blocks. “Feather” brand single edge ejector blades are currently used for paraffin sectioning on model RM2135 and RM2265. Glass knives are used when sectioning resin on the RM2265. Refer to manufacturer’s instructions and re-evaluate the RA and SOP if an alternative blade type is used.

The following operational safeguards must be followed when using blades and knives, to reduce the risks to users.

Exercise caution during use, and be aware of the depth and extreme sharpness of the blade. Do not leave open blades or knives on benchtops; place open sharps in a receptacle when not in use. Dispose of sharps in a sharps bin after use.

Avoid the edge of a blade mounted in the blade holder. Swing the knife guard into place when a steel blade is mounted in a knife holder but not in use. If the instrument must be left unattended with a blade in place, use the blade guard and place a sign “CAUTION: BLADE IN PLACE” in front of the blade.

General Operation of the RM2265 (refer to RM2135 manual for operation):

Preparing a specimen

Trim a block under a stereo microscope or on the bench. Wear protective glasses when trimming resin blocks. If the block must be trimmed on the rotary microtome, make sure no blade or knife is in place, or use the knife guard.

Switch on the RM2265. Check that there is no blade or knife left in the holder. Check that the hand-wheel and main brake are locked.

Clamp the block in the appropriate specimen block holder on the microtome, prior to installing the blade or knife. When inserting or changing specimens, ensure the microtome hand-wheel is in the locked position and check that it is firm. Accidents are most likely to occur if the specimen block holder moves during specimen changes, causing the operator’s hand to contact the blade or knife.

Inserting a steel blade. Carefully eject a single edge steel blade from the dispenser. Hold it only by the underside or ends and avoid touching the sharp cutting edge. Slide the blade into the appropriate knife holder. Securely clamp the knife lever. Cover the cutting edge with the knife guard until ready to work. Check and/or adjust the appropriate clearance angle (usually between 0° and 3°).

Inserting a glass knife. Pick up a glass knife by the sides and avoid touching any edges, in particular the sharp cutting edge. Slide the glass knife into the appropriate knife holder. Put on safety glasses. Securely clamp the glass knife with the side screw, then gently but firmly clamp the end screw. Avoid overtightening the end screw, which may crack the corner of the knife.

Cutting sections.

Move the specimen block holder to the rear limit using the “home” key.

Set the desired sectioning and/or trimming thicknesses with the “Section” and “Trim” keys.

Lower the knife guard if cutting paraffin sections with a steel blade. Approach the knife holder close to the specimen, then hand tighten the knife holder lever.

Orient the block face towards the knife if necessary, using the X and Y adjustment knobs behind the specimen block holder.

Unlock the hand-wheel and rotate it to bring the specimen close to the knife, but not touching it, as it passes the knife. The knife holder can be advanced using the fast or slow forward key. Do not drive the block into the back of the knife. Do not overhang the block over the knife, or a piece of the block may break off when it strikes the knife.

Manual trimming. Start trimming manually by turning the hand-wheel (rotation is clockwise, i.e. away from the operator). Rotate the hand-wheel at a speed appropriate to the hardness of the specimen. Always rotate at a slow speed when sectioning hard samples.

Automated trimming. First set the sectioning window (sets distance above and below the knife edge; speed in this window is controlled during automated sectioning). Rotate the hand-wheel clockwise to lower the block to just above the knife. Press the key with two arrows pointing inwards (a green light will blink). Lower the block to below the knife. Press the key again (it will stop blinking).

Start trimming automatically by selecting and pressing the continuous “Cont” button. To start, press the two blue Enable and Run/Stop keys together. Trimming (and sectioning) speed can be controlled by the speed dial. Proceed in “Cont” mode until the specimen block face has been trimmed and the desired sectioning plane has been reached. Press either blue key to stop automated trimming (and sectioning).

Select the desired section thickness with the “Section” key.

Paraffin sections. To create a ribbon of paraffin sections rotate the hand-wheel clockwise at a uniform speed, or use the automated “Cont” function as described above. Use a small brush or stainless steel needles to carefully retrieve sections or ribbons of sections from the microtome, keeping hands away from moving parts. Move the ribbon of sections or portions of the ribbon onto warm water and mount onto slides, using a pair of needles or forceps. Handle needles with care and keep in safe place when not in use.

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Resin sections. Sectioning and slide mounting resin sections depends on the resin type, and requires demonstration (LR white, Spurr's and Epon-type resins are sectioned onto water, Technovit is sectioned dry). See Adelaide Microscopy staff.

To change a specimen, lock the hand-wheel, position the knife guard over the cutting edge if using a steel blade, and mount a new specimen block on the specimen block holder.

On completion of work – steps to make safe (including clean up, any waste disposal & service/maintenance requirements)

When sectioning is finished, lock both the hand-wheel and the main brake.

Place used glass knives in the sharps bin or glass waste bin.

Remove the steel blade from of the knife holder by using the magnet on the end of the Leica brush, or pushing it with a pair of forceps. Place the used steel blade in the “used blade” repository on the underneath of the blade dispenser, or into a sharps bin.

Remove the specimen block from the specimen block holder.

Transfer all section waste to the general waste.

To remove paraffin, clean the instrument and accessories with a brush. Rubbing with dry paper towel will remove adhering paraffin wax, or if necessary, use paper towel dampened (not wet) with 70% ethanol. Do not use solvents that contain acetone or xylene.

Resin dust poses a health hazard if inhaled. Clean resin fragments carefully from the microtome and block trimming area to prevent resin dust becoming airborne. Wipe up resin fragments with paper towel dampened with water or 70% ethanol. Do not use solvents that contain acetone or xylene

Emergency and Spill Procedures, Transport or storage requirements (where relevant), First aid/Medical


In the event of an injury, please advise an Adelaide Microscopy staff member and first aid officer for treatment and the local HSW representative to report the incident.

First Aid

Minor cuts from the blade can be dealt with using first aid.

However, if cuts from a microtome knife are deep they may require medical care at a Hospital. Seek medical attention immediately.

Prepared by

People involved in the drafting of this SOP	Gwen Mayo		
Person authorising the SOP	Name:	Angus Netting	Signature 
	Position:	Director Adelaide Microscopy	

This SOP must be reviewed after any incident/injury associated with this activity or when a Risk assessment is reviewed.

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