

**HAZARD MANAGEMENT – SAFE OPERATING PROCEDURE (SOP)**

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

<b>NAME OF THE TASK/ACTIVITY</b>	<b>LEICA AS LMD LASER DISSECTION MICROSCOPE</b>	<b>DATE: 24/02/2020</b>
<b>LOCATION</b>	ADELAIDE MICROSCOPY WAITE FACILITY AFW WEST (BUILDING 19) ROOM G12A ADELAIDE MICROSCOPY, AHMS, LEVEL 6	Insert photo (Optional)
<b>RISK ASSESSMENT (RA) NAME</b>	Laser Microdissection Microscope Leica AS_RA_Waite	
<b>Residual risk rating on the RA</b>	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High <input type="checkbox"/> Very High	
<b>Hazards identified on the RA</b>	<b>Contact with electricity or potential for electric shock</b> <b>Exposure of eyes to the Laser beam.</b> <b>Exposure to non-ionising radiation (UV light)</b> <b>Mercury lamp breakage and vapour or liquid leak</b>	

**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**

The Leica AS LMD laser dissection microscope is a compound microscope used for laser dissection of individual cells or groups of cells of slide-mounted sections.

The microscope incorporates a Nitrogen UV 337 nm laser working with 20 Hz frequency, 4 nanosecond pulses, 75kW peak power. The laser belongs to Laser Class 3B and the system as a whole to Laser Class 1.

The AS LMD at the Waite Facility is equipped with a Leica EL6000 ultraviolet (UV) light source for fluorescence microscopy. High energy UV light is provided by an HXP Mercury Short Arc lamp.

**Hazards**

Potential for electric shock if a user were to remove panels from the microscope.

Exposure of eyes to the laser beam can cause blindness.

Incorrect use of the UV light can lead to burns and cancers in eyes and skin.

Damage to the lamp may cause it to burst and release toxic mercury liquid or vapour into the room.

There is a risk of burns or electric shock when changing a mercury bulb.

**Risk Control Measures**

Engineering controls:

The user operable parts on the Leica laser dissection microscope are all accessible from the front of the instrument, and include the upright light microscope and controller, and the computer (switch, mouse and keyboard). There is no risk involved in the operation of these parts. However, misuse of these parts can result in damage to the instrument. Users of the instrument should not remove any fixture or panel from the microscope or access the rear of the instrument.

The microscope has several inbuilt safety features to stop people injuring themselves with the laser or the mercury lamp.

The laser beam is contained and shielded in a box which cannot be opened accidentally. The laser can only be used if the key on the laser unit has been switched on, and a button in the software is pressed.

There are low risks to the user associated with use of the EL6000 UV light source. The HXP UV lamp is pre-centered; there is no risk of incorrect alignment, therefore a reduced risk of overheating and bursting. The UV lamp is contained and shielded in a box which cannot be opened accidentally.

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To allow the UV light to the specimen the operator must first switch on the UV controller, then manually operate a button on the computer software to open a shutter. The UV light may also be blocked via a lever on the microscope. UV filters in the observation beam paths protect the eyes against UV radiation.

A protective screen around the stage guards the user's eyes from the stage area. If the protective screen is removed from around the microscope stage the laser will not operate. The protective screen prevents UV radiation from reaching the eyes. This protective screen must always be in place when using UV for fluorescence microscopy: note that UV light can reach the stage with or without the screen in place.

The lifetime of the EL6000 HXP pre-centered mercury lamp is 3,000 hours, which is much longer than the older HBO mercury lamps. Lamp lifetime is monitored by a counter on the front of the lamp housing.

Procedural controls.

Only trained users are to operate the instrument. All new users are to be given practical training in instrument operation by a member of Adelaide Microscopy staff. Users must also follow guidelines in the manual and safe operating procedures for operation of the microscope and UV light source.

Users must not tamper with the instrument such that they can look directly into a laser beam or a reflection of a laser beam. Under no circumstances is the user entitled to open the laser unit. The laser system is encapsulated and may only be repaired or exchanged by authorised personnel.

Refer to risk assessment and safe operating procedure for mercury lamps. Do not use the lamp beyond its life expectancy of 3,000 hours. If the lamp is used over the life expectancy, or is damaged, there is a risk that the lamp may burst and leak mercury vapour. A cold lamp may accidentally be broken during replacement. In the unlikely event that a mercury lamp breaks immediately evacuate everyone from the room and shut the door. Notify the OH&S officer immediately. Mercury is most dangerous in the vapour form, but in the solid form it can be cleaned up under supervision with relative safety. As part of the maintenance schedule for this instrument Adelaide Microscopy staff only are to replace the HXP lamp after 3,000 hours.

The EL6000 UV light source requires a warmup and cooldown time. Do not turn on a warm mercury lamp until it has cooled. The lamp should be left on if it is to be used again the same day, to reduce the risk of damaging a warm lamp.

Users must not tamper with or operate the instrument in any way such that they can look directly at the UV light.

Handling of biological material may present hazards; the safe operating procedures for handling biological material must be followed. The handling of other laboratory items (for example, sharps, clearing agents and chemicals) must follow the relevant safe operating procedures.

**General Procedures:**

Users should operate the instrument in accordance with the manufacturer supplied operating instructions under the instruction of a member of Adelaide Microscopy staff.


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

Follow the shut down procedure in the manual.

**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.

**Prepared by**

People involved in the drafting of this SOP	Gwen Mayo Astrud Tuck		
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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