

# Risk Assessment Form

(This is an active document and must be maintained)



Materials Science and Metallurgy

Date: 15<sup>th</sup> September 2017

Supervisor of Room/Area: **Prof. Serena Best & Prof. Ruth Cameron**

Room or area: **2\_015 (Confocal Lab)**

Name of Assessor(s): **Jennifer Shepherd**

(Describe location)

**Title of Activity / Experiment / Work Area:**

**Use of confocal microscope**

**Description of Activity / Experiment / Work Area:**

Production of high resolution, depth selective images, fluorescent images, fluorescent imaging and quantitative measurement using confocal microscopy.

This Assessment does not include the risks associated with the samples imaged. Separate risk assessments may be required for these samples including biological assessment where necessary.

**SECTION 1:** Identify all significant hazards, who or what may be affected by each individual hazard and controls in place to reduce risk to a minimum.

<b>Hazard Description</b>	<b>Hazard to whom or what</b>	<b>Controls in place to reduce risk to a minimum</b>
Damage to eyes from exposure to Type IIIB and Type IV lasers	User	Safety interlocked and enclosed from source to objective aperture (fully contained beam delivery system). Only trained and authorized Leica technicians permitted in the Laser area.  Objectives or specimens cannot be changed during scanning operations, when scan mode is switched off, safety shutter is closed at the tube. Laser will only emit if system is closed and all safety interlocks are in place.  AUTHORISED FULLY TRAINED USERS ONLY

Hazard Description	Hazard to whom or what	Controls in place to reduce risk to a minimum
Electric shock from connections	User	Inspect all electrical equipment and power cables before use and do not use any equipment that shows any signs of damage. Ensure electrical equipment carries an up to date PAT label before using it.
Explosion of mercury arc bulb	User	Hours of use of mercury bulb should be carefully monitored and the bulb changed after approximately 300 hours or as soon as flickering is observed.

**SECTION 2: Emergency Procedures**

For suspected laser exposure to eyes seek medical attention and keep injured person in seated position to prevent further damage to the retina. Skin burns should be treated as other heat burn and medical attention sought.

In the case of mercury bulb explosion evacuate the room and seek medical attention.

Lasers should be switched off at the key in the case of evacuation.

Signature of Assessor(s)		Date: 15/09/17
Signature of Supervisor		Date: 19/9/17

**SECTION 3: Review** - This assessment must be reviewed every 12 months or earlier if the basis of the original assessment is altered.

Review Date	Reviewed by (Signature)

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## Change log

Change	Date	Updated by	Description
1	11/09/2017	W. Skelton-Hough	<ul style="list-style-type: none"><li>• Room or area details changed.</li><li>• Risk assessment title and page count added to document footer.</li><li>• Wording of electrical shock risk amended.</li></ul>
2	15/09/2017	W. Skelton-Hough	Section 3 added back in to risk assessment.

# Risk Assessment

Background Information – Leica TCS SP2					Date: 24/02/09 Name of Assessor: J. Shepherd	
Describe the product and application	The <b>Leica SP2</b> has three lasers connected to its confocal scan head, which is in turn connected to the Leica DMR microscope. It is used for the fluorescent imaging of biological specimens.					
Describe the Laser	Laser Type	Wavelength (nm)	Maximum luminous power at laser output (mW)	Maximum luminous power in focal plane (mW)	Pulse duration	Laser Class
	ArKr / Ar	458,476, 488, 514	<200	<50	Continuous wave (non-pulsed)	IIIB
	HeNe (green)	543	<1.5	<0.5	Continuous wave (non-pulsed)	IIIB
	HeNe	633	<15	<4	Continuous wave (non-pulsed)	IIIB
Describe the Beam Delivery System	The laser beams are delivered by a closed fibre optic system to the confocal head. In the Leica machine the laser light is merged in the laser merge unit then passed through an AOTF and into the optical system of the microscope.					
Describe the Laser Process	Laser light is applied, through the microscope objective, to the sample. In the Leica the laser beam scans the sample. Emitted fluorescent light, from appropriate dyes or proteins, is collected through the objective, and detected by PMTs in the confocal head.					
Describe the Environment	The system is in a dedicated room.					
Who uses the product or could affect its operation?	Trained users and service engineers					
Underline the part(s) of the life cycle of interest	<i>Planning, Design, Manufacture, Testing, Transport, Installation, Commissioning, <b><u>Normal Operation</u></b>, <b><u>Maintenance, Servicing, Modification, Decommissioning, Disposal</u></b></i>					

# Risk Assessment

Assessment Number: 1 Assessed by: J.Shepherd		Assessment Date: 24/02/10 Review Date:		Activity/Facility Assessed: Leica TCS SP2 Location: Arup Building 426 (off 404)	
STEP 1	STEP 2	STEP 3			
List significant hazards	List groups of people who are at risk	List existing controls	Are these controls OK?	What is the risk factor from these hazards?	Actions Required (See over)
<b>The Laser:</b> Electric shock from high voltage power supply  Cooling system  Explosion of mercury arc lamp  Equipment interconnections -Trip hazard and possible damage to equipment (e.g.fibre breakage)	All	Lasers are fully contained in cabinets. Only qualified service personnel are permitted to open these boxes. Instructions to this effect are contained in the local rules and are part of pre-use training required for authorisation.  Integrity of system is checked by maintenance technician. System is serviced regularly  Lamp is changed regularly after 500 hours by technician. Housing of lamp is designed to contain explosion.  All optical guides and other equipment interconnections are kept out of the way.	Yes  Yes  Yes	Low  Low  Low	Add to inspection checklist  Add to inspection checklist  Add to inspection checklist
<b>Beam Delivery:</b> Exposure to laser radiation, Class 3B and 4, UV-A and visible wavelengths.  UV-A – Short term – burns to skin Long term – premature cataracts in lens of eye. Associated with malignant melanoma in skin		Beam delivery 1. Optical fibres encased in flexible metal coverings and are attached by screws on fixings at all points. They are routed behind the equipment. Only qualified			Add to inspection checklist



# Risk Assessment

Assessment Number: 1		Assessment Date: 24/02/10		Activity/Facility Assessed: Leica TCS SP2	
Assessed by: J.Shepherd		Review Date:		Location: Arup Building 426 (off 404)	
STEP 1	STEP 2	STEP 3			
List significant hazards	List groups of people who are at risk	List existing controls	Are these controls OK?	What is the risk factor from these hazards?	Actions Required (See over)
<p><b>The Laser Process:</b></p> <p>Reflections of laser radiation from sample and metalwork</p>	Users	<p>Light intensity at the process site is reduced. Extra protection by a light shield of appropriate filter material. User training and the local rules emphasise shutting off of lasers for changing samples and avoiding reflections of laser light from samples. Users are not permitted to change the objective lenses.</p>	Yes	Low	
Chemical hazards from samples	Users	<p>Only microscope oil and ethanol are used. Exposure to the former is controlled by wearing gloves (see COSSH form)</p>	Yes	Low	
Biological hazards from samples	Users	<p>Refer to individual biological risk assessment</p>			
Contamination	All	<p>Ditto</p>			

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Assessed by: J.Shepherd		Review Date:		Location: Arup Building 426 (off 404)	
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<b>Environment &amp; People:</b>					
Small room - Risk of tripping or inadvertent damage to system due to overcrowding.	Users	The room is equipped and intended for a maximum of 5 people in normal circumstances, as explained during training.	Yes	Low	
Use by inadequately trained users	Users	All users must be authorised; before this can occur they must have received proper training. They must also sign a declaration that they have read the local rules.	Yes	Low	
Prolonged use of equipment can result in eye strain and ergonomic hazards	Users	Restrict length of time using equipment, workstation designed for ease of use and fully adjustable chairs provided.	Yes	Low	