

**HS026**

**Safe work procedure**

1. Completed by: Russell Lowe

Staff number: z3208498



The Safe Work Procedures Guideline (HS027) should be consulted to assist in the completion of this form

Faculty/Division: Faculty of the Built Environment		School/Unit: Australian School of Architecture and Design		
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**2.Safe work procedure title and basic description of activity**

**Title:** SWP Universal Laser Systems Model VLS3.50 Desktop Laser Cutting and Engraving System.

**Description of activity:** Use of equipment to cut or engrave various types of material.

**3.List hazards and risk controls as identified during risk management**

Associated risk assessment number and location:	Hazards	Controls
Room 2025 Red Centre West Wing	<ul style="list-style-type: none"><li>• Toxic Fumes</li><li>• Moving Parts</li><li>• Fire</li><li>• Electricity</li><li>• Trip Hazards</li><li>• Laser energy</li><li>• Heavy materials</li><li>• Untrained operators</li><li>• Bystanders</li><li>• Dust</li></ul>	<ul style="list-style-type: none"><li>• Training</li><li>• SWP, RM, MSDS</li><li>• Equipment manual</li><li>• Scheduled maintenance</li><li>• Fume extraction system</li><li>• Housekeeping</li><li>• Fire extinguisher</li><li>• Restricted access</li><li>• Manual handling guidelines</li><li>• Audible over temperature alarm</li></ul>

**4.List resources required including personal protective clothing, chemicals and equipment needed**

Fire extinguisher (CO2 type), Fume extraction system, trained operators, accredited service technician, I.T. Assistance, lens cleaner solution, cotton buds, paper toweling, laser focusing tool.

**5.List step by step instructions or order for undertaking the task**

**NOTE:**

- This document needs to be read in conjunction with the **Universal laser Systems Reference Guide** (the guide is located near the laser-cutting equipment in room 2025) which includes the **VLS Desktop User Guide Rev 2012-08.pdf** on Disk 2.

**MAINTENANCE:**

- This system requires maintenance tasks to be performed in order to operate correctly. The frequency of these tasks varies depending on the type of material being processed, quantity of material being removed, hours of operation & quality of the exhaust system.

**WARNING: Do not attempt any maintenance task unless you have been trained to perform it – if in any doubt, ask a trained staff member for assistance!**

**PRE-START CHECKLIST:**

#### OPERATOR:

- You must obtain initial instruction and competency sign-off from trained staff before you can use the laser.
- Don't consume any food, or liquids in open containers, when you are in the laser room.
- Don't operate the laser if you are feeling tired, stressed or under the effects of medication, alcohol or drugs.

#### WORKSPACE:

- Remove any slip/trip hazards.
- Confirm room lighting is sufficient.
- Non-authorized persons should leave the room.
- Confirm fire extinguisher (CO2-type) & UNSW Emergency Procedures flipchart are present & accessible.
- Know the location of nearest first aid officer, first aid kit & telephone.

#### EQUIPMENT:

- See the Optics section in the VLS Desktop User Guide Rev 2012-08.pdf (page 95) for detail on how to clean the lens's and mirrors in the system.
- Remove debris from the tray under the cutting table - provided debris is not hot, empty into a garbage bin.
- **Report any problems to a trained staff member before proceeding to 'Start-Up Procedure'.**

#### POWER-UP PROCEDURE:

- Power-on connected computer, log-in & allow to fully boot-up.
- Power-on laser using '**On/Off**' switch on VLS keypad.
- Confirm that system has performed self-check of drive motors, focus carriage has returned to the home position(rear-right corner of cutting table) and LCD display on VLS keypad is highlighting the '**FILE**' menu item.

#### LOADING MATERIAL (see also VLS Desktop User Guide Rev 2012-08.pdf page 33)

- Check relevant M.S.D.S.(Material Safety Data Sheet) that material is safe for laser-cutting (a verbal assurance from the person supplying the material is not sufficient proof, always check with the M.S.D.S. and/or trained staff).  
**WARNING: If in any doubt, DO NOT CUT THE MATERIAL!**
- Check material fits within the limits of cutting table and is flat enough so that it will not obstruct the moving focus carriage.  
**WARNING: If in any doubt, DO NOT CUT THE MATERIAL!**
- Referring to manual handling guidelines, open top door and position material in rear-left corner of cutting table against edge rulers, secure material to cutting table with masking tape or plastic clips.

#### FOCUSING THE LASER (see also VLS Desktop User Guide Rev 2012-08.pdf page 63)

- Check there is clearance between highest point of material to be cut and lowest point of focus carriage. If insufficient clearance, use '**DOWN**' button on VLS keypad to lower cutting table until there is clearance.
- Press '**AUTOFOCUS**' button on VLS keypad once to move focus carriage to focusing position.
- Place base of focus tool on top on material with its flat edge against front side of focus carriage.  
**WARNING: DO NOT position focus tool directly under focus carriage – this can damage the unit.**
- Keeping hands away from the area in-between focus tool & focus carriage, slowly raise the cutting table using '**UP**' button on VLS keypad until top of beveled edge on focus tool meets bottom edge of focus carriage – when these points meet, the laser is focused.  
**WARNING: Engraving/cutting out of focus is a potential fire hazard! (max. allowable focus error is 1mm)**
- Close top door.

#### START EXTRACTION:

- Push the green button on the front of the extractor unit that the VLS3.50 sits on to turn the unit on.
- Turn the rotary dial, immediately to the right of the green button, clockwise to increase the extraction amount.

#### PRINTING (SENDING A JOB) TO THE LASER (VLS Desktop User Guide Rev 2012-08.pdf page 33)

### CUTTING/ENGRAVING:

- Once cutting/engraving has started, visually check the material to ensure that there is no sign of flame and that smoke/fumes are not building-up inside the system. If you see either of these things, stop the cutting/engraving process immediately and contact a trained staff member.
- If cutting/engraving is in progress, do not leave the system unattended. If you need to leave the room for any reason, use the VLS keypad to '**STOP**'/'PAUSE' the system and confirm there are no signs of fire before you leave the room.

**WARNING: Leaving the machine unattended is a fire risk!**

### REMOVING MATERIAL *(VLS Desktop User Guide Rev 2012-08.pdf page 35)*

- Confirm that the laser system has finished processing the material, the laser beam has turned-off, the focus carriage has moved to the home position(rear-right corner of cutting-table)and the red light on the VLS keypad has turned-off.
- Wait for a few seconds for the extraction system to evacuate any fumes from the inside of the system.
- Open top door, first check that material is cool enough to touch, then remove (referring to manual handling guidelines) and relocate to a well-ventilated, unoccupied area where any residual fumes can be emitted without harming anyone.

**WARNING: Allowing debris to accumulate in the trays or emptying hot debris into a garbage bin are potential fire hazards!**

### STOP EXTRACTION:

- Push the green button on the front of the extractor unit that the VLS3.50 sits on a second time to turn the unit off.

### POWER - DOWN PROCEDURE:

- Power-off laser using '**On/Off**' switch on VLS keypad.
- Log-off connected computer & allow to fully shut-down.

## 6.List emergency shutdown procedures

- To instantly disconnect all AC power to the system, depress the emergency stop button (located rear-left of the ILS keypad).

## 7.List emergency procedures for how to deal with fires, spills or exposure to hazardous substances

- **Fires:**  
Use the VLS keypad to put the system into '**STOP**'/'PAUSE' mode. After focus carriage gets to 'home' position, power-off laser and switch-off fume extraction system. Clear everyone from the immediate area, open top door of system, extinguish fire with CO2 extinguisher (pointing it at the base of the fire) and notify a trained staff member and/or UNSW security ASAP (ph **9385 6666**) of the incident.
- **Building Evacuation:**  
Put the system into '**STOP**'/'PAUSE' mode. After focus carriage gets to 'home' position, power-off laser, switch-off fume extraction system and compressed air supply. After visual check to confirm there is no fire problem, close laser room door & proceed to evacuation assembly point.
- **Spills:**  
If fumes are present, switch-on extraction system to help remove them. Leave the room, closing door behind you to contain fumes (grab MSDS info on the way out). When you are clear of the room and any fumes, notify a trained staff member of the situation. The trained staff member will collect Chemical Response Spills-kit and follow recommended clean-up procedure listed on relevant MSDS.

## 8.List clean up and waste disposal requirements

- **Debris from the tray under cutting table:** provided debris is cool, empty into metal garbage bin. If debris is still hot, allow to cool before emptying.

**9. List legislation, codes of practice, manufacturers manual, industry standards etc used in the development of this SWP**

- Work Health and Safety Regulation 2011
- Universal Laser Systems, Inc.: 2007 Industrial Systems Laser Engraving and Cutting System Safety, Installation, Operation, and Basic Maintenance Manual.
- AS/NZS 2211 (series) Safety of Laser Products
- Laser Laboratory Inspection Checklist - Laboratory Safety of laser products Part 14: A user's guide-IEC 60825.14-2011
- Laser Laboratory Inspection Checklist -Laboratory.....Safety of laser products Part 1 : Equipment classification and requirements -IEC 60825.1-2011

**10a. List competency required – qualifications, certificates, licensing, training - e.g. course or instruction:**

For service technicians engaged to perform annual major maintenance: Laser Safety officer training

**10b. List competency of assessor**

Russell Lowe: Training by Universal Laser Systems on ILS9150D and VLS3.50 Desktop laser cutters and Purex Xbase 400 filtration systems.

**11. Supervisory approval, and review**

<b>Supervisor: Russell Lowe</b>		<b>Signature:</b> 
<b>Responsibility for SWP review:</b>	Russell Lowe	<b>Date of review: July 2016</b>

**12. SWP Sign off sheet**

**SWP name and version:**

In signing this section the assessor/ authorisor agrees that the following persons are competent in following this SWP

Name	Signature	Date Competent	Name of Assessor/Authoriser	Assessor/Authoriser signature

