

Laser Safety

Business Name:		ABN:	
Business Address:			
Contact Person:	Phone:	Email:	

THIS RISK ASSESSMENT IS APPROVED BY THE PCBU ON THIS PROJECT

Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.

Full Name:		
Signature:	Title:	Date:

CLIENT OR PRINCIPAL CONTRACTOR DETAILS

Client:	SCOPE OF WORKS
Project Name:	
Project Address:	
Project Manager:	
Contact Phone:	
Date Risk Assessment supplied to Project Manager:	



RISK MATRIX									
LIKELIHOOD	INSIGNIFICANT	MINOR	MODERATE	MAJOR	CATASTROPHIC	SCORE	ACTION	HIERARCHY OF CONTROLS	
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE			Elimination Remove the hazard.	
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED	Substitution Replace the hazard.	
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Review before work starts.	Isolation Isolate People from the hazard	
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	2M MODERATE	Ensure control measures in place.	Engineering Isolate the hazard	
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 HIGH	1L LOW	Monitor and keep records.	Administrative Change	
								PPE	

Risk Rating & Required Action:	
4A	Stop work. The risk is intolerable. Eliminate the hazard or redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or higher-level authorisation is required.
3H	Review and approve additional controls before task starts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in place and effective. Proceed with caution; monitor conditions.
1L	Proceed, following standard operating procedures. Monitor and keep records.

Consequence Scale:			
Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
Catastrophic	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
Major	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
Moderate	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
Minor	First-aid only, no lost time	negligible delay	Isolated non-conformance
Insignificant	No injury	no schedule impact	Deviation caught and corrected on site

Notes on Hierarchy of Controls:
Remember to apply controls in the preferred order shown by the coloured pyramid:

1. **Eliminate**
2. **Substitute**
3. **Isolate**
4. **Engineering**
5. **Administrative**
6. **PPE**

Always document **why** a lower-order control is accepted if elimination or substitution is not reasonably practicable.

aligned with Safe Work Australia's Managing the risk of fatigue at work (2023) and ISO 45001:2018 clauses 6–8.

JOB STEP	POTENTIAL HAZARDS	IR	CONTROL MEASURES	RR
SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
1. WHS Governance, Legal Compliance & PCBU Duties	<ul style="list-style-type: none"> Lack of clear assignment of WHS duties for laser safety under WHS Act 2011 and WHS Regulation Failure to identify laser equipment as plant and hazardous sources of optical radiation (including UV) Inadequate integration of laser safety into overall WHS management system and safety policy No documented laser safety objectives, performance standards or monitoring arrangements Failure to consult workers and Health and Safety Representatives (HSRs) about laser risks and controls Inadequate consideration of overlapping duties with contractors, suppliers and host employers Non-compliance with relevant Australian Standards (e.g. AS/NZS IEC 60825 series for laser safety, AS 2211, AS/NZS 1336 & 1337 for protection and optical radiation) 	4A	<ul style="list-style-type: none"> Establish and document a Laser Safety Policy endorsed by senior management that clearly references WHS Act 2011 and WHS Regulation obligations and relevant Australian Standards (e.g. AS/NZS IEC 60825 series, AS 2211, AS/NZS 1336, AS/NZS 1337) Formally assign a competent Laser Safety Officer (LSO) role with authority and resources to implement and maintain the laser safety program Integrate laser and UV radiation risks into the organisation's WHS management system (risk management procedures, consultation processes, incident management, change management) Maintain a register of all laser and UV-emitting plant (including classes 1, 2, 3A/3R, 3B and any associated UV sources) with class, location, responsible person and maintenance status Implement a documented legislative and standards compliance register for laser safety and review it at least annually on legislative/standards/legislation change Ensure formal consultation procedures with workers and HSRs specifically include laser safety matters, proposed changes to laser plant and new processes Define responsibilities for PCBUs, officers, managers, supervisors, contractors and workers regarding laser and UV safety in position descriptions and WHS procedures Establish a documented assurance process (e.g. internal audits, compliance checklists) to verify ongoing adherence to the WHS Act 2011 and applicable standards for laser safety Include laser-related WHS duties and due diligence obligations in officer training and board/senior management WHS briefings 	2M
2. Design, Procurement & Commissioning of Laser Plant	<ul style="list-style-type: none"> Purchase of laser cutters and engraving machines with inadequate safety features (interlocks, shielding, emergency stops) Acquisition of laser plant without confirmation of correct laser class labelling and documentation Imported or non-compliant laser systems that do not meet AS/NZS IEC 60825 or equivalent safety standards Poor integration of ventilation and fume extraction systems for metal fibre laser cutting and engraving Inadequate consideration of UV emissions from certain laser sources and processes Lack of safety-in-design review prior to installation and commissioning 	4A	<ul style="list-style-type: none"> Implement a formal plant procurement procedure requiring all continuous and pulsed laser beam machines, metal fibre laser cutters and engravers to comply with AS/NZS IEC 60825, AS 2211 and manufacturer safety specifications Specify engineering safety features in purchase contracts, including class-appropriate interlocked enclosures, key-control switches, emergency stop devices, beam shutters, beam dumps and protective housings Require suppliers to provide documented evidence of laser classification, conformity to relevant Australian Standards and risk information (operator manuals, safety data, installation requirements) Conduct a pre-purchase WHS review and safety-in-design assessment for all new or modified laser plant, involving the LSO and maintenance personnel Ensure building and room design allows for safe siting of lasers (controlled access, non-reflective surfaces where practicable, adequate space for guarding and maintenance) Include performance standards for local exhaust ventilation and fume extraction in procurement of metal laser cutting and engraving machines Undertake formal commissioning checks and validation of all safety systems prior to operational use, with results recorded and signed off by a competent person 	2M

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	<ul style="list-style-type: none"> Inadequate pre-acceptance testing of safety functions (interlocks, guarding, light curtains, door switches) 		<ul style="list-style-type: none"> Prohibit use of non-certified, modified or homemade laser systems in the workplace unless a detailed engineering risk assessment and approval process is completed 	
3. Laser Classification, Inventory & Area Segregation	<ul style="list-style-type: none"> Incorrect or missing classification of lasers leading to underestimation of risk (Class 3B treated as Class 2, etc.) Mixing different laser classes (1, 2, 3A/3R, 3B) within the same work area without appropriate segregation Uncontrolled access to higher-class laser equipment by untrained personnel Lack of clearly defined laser-controlled areas for Class 3A/3R and Class 3B lasers Inadequate or incorrect warning signage for laser areas and UV sources Inaccurate plant inventory causing oversight in maintenance and inspection regimes 	3H	<ul style="list-style-type: none"> Maintain a detailed laser inventory identifying class, wavelength, power, pulse characteristics, location, responsible manager and associated hazards (including UV output where relevant) Verify the classification and labelling of all lasers in line with AS/NZS IEC 60825 and ensure durable, legible labels are affixed to each unit Designate and document laser-controlled areas for Class 3A/3R and Class 3B systems with locked or controlled access doors and restricted entry to authorised personnel only Install standardised warning signage at entries to laser-controlled and UV-emitting areas in accordance with relevant Australian Standards and organisational signage procedure Develop and enforce an access control procedure for laser rooms and enclosures, including card access, key control and visitor sign-in requirements Implement periodic audits of the laser inventory and physical locations to confirm accuracy and identify unauthorised lasers or UV sources Ensure layout and segregation of laser classes are included in site plans and communicated through site inductions and area orientation 	1L
4. Optical Radiation Hazard Identification & Exposure Assessment	<ul style="list-style-type: none"> Inadequate identification of direct, reflected and scattered laser beams (visible, infrared, UV) Unrecognised UV exposure from certain laser processes and associated inspection lamps Failure to assess potential for specular reflections from metal surfaces and workpieces Underestimation of eye exposure from Class 2 lasers due to assumptions about blink reflex protection No formal assessment of exposure levels against relevant exposure limits for optical radiation Insufficient documentation of hazard zones (Nominal Ocular Hazard Distance and controlled areas) Failure to consider cumulative exposures for workers moving between multiple laser and UV workstations 	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M

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5. Engineering Controls, Guarding & Interlocks	<ul style="list-style-type: none"> • Failure of interlocks on access doors, hoods or enclosures leading to exposure to Class 3A/3R or 3B beams • Bypassing or defeating interlocks and safety systems for maintenance or productivity reasons • Insufficient or poorly designed guarding allowing emission of stray beams or UV radiation • Use of open-beam configurations for laser cutting or engraving without adequate enclosures • Inadequate beam dumps or stops causing uncontrolled beam propagation beyond work area • Lack of fail-safe design for critical safety functions (door interlocks, key switches, shutters) 	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M
6. Ventilation, Fume Extraction & Fire Safety for Laser Cutting	<ul style="list-style-type: none"> • Accumulation of metal fumes, vapour and particulates from metal fibre laser cutting and engraving • Inadequate capture and filtration of combustion products and plume from laser cutting of coated materials • Generation of flammable gases or ignition of combustible materials in near laser cutting zones • Failure of extraction systems leading to poor air quality and corrosion of equipment • Uncontrolled exhaust discharge causing environmental or offsite exposure issues • Reliance on natural ventilation where process demands local exhaust ventilation 	3H	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	1L

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7. Administrative Controls, Procedures & Permit Systems	<ul style="list-style-type: none"> Absence of documented procedures for safe use of laser and UV equipment Inconsistent operating practices between shifts and locations increasing error likelihood Use of high-risk laser equipment without any formal authorisation or permitting process Poor communication of changes to procedures or safety requirements Lack of documented controls for out-of-hours or remote operation of laser cutters and engravers 	3H	[REDACTED]	1L
8. Competency, Training & Authorisation	<ul style="list-style-type: none"> Operators, maintenance staff and supervisors lacking competency in laser hazards and control measures No formal verification of skills prior to authorising operation on Class 2 or 3B lasers Inadequate awareness of specific risks related to UV radiation and photosensitising substances Contractors and visitors exposed to laser or UV hazards without appropriate induction Supervisors unable to recognise unsafe behaviours or non-compliant setups 	4A	[REDACTED]	2M
9. Personal Protective Equipment (PPE) Management System	<ul style="list-style-type: none"> Incorrect selection of laser safety eyewear for wavelength and optical density 	3H	[REDACTED]	1L

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	<ul style="list-style-type: none"> • PPE reliance without supporting engineering and administrative controls • Inadequate management of UV-protective PPE (face shields, gloves, garments) • Poor condition, contamination or damage to laser eyewear and other PPE • Lack of fit, comfort and availability leading to non-use or misuse of PPE 		[REDACTED]	
10. Maintenance, Inspection & Change Management	<ul style="list-style-type: none"> • Failure of safety-critical components (interlocks, shutters, enclosures, extraction fans) due to inadequate maintenance • Uncontrolled modifications to laser equipment, beam paths • Use of out-of-calibration or damaged laser systems resulting in unexpected power outputs • Lack of inspection regime for cable connections, optics, cooling systems and UV sources • Poor communication of maintenance findings and temporary repairs to operations 	4A	[REDACTED]	2M
11. Facility Layout, Housekeeping & Physical Environment	<ul style="list-style-type: none"> • Inappropriate location of laser equipment leading to uncontrolled exposure in adjacent areas • Use of highly reflective surfaces and fixtures within laser rooms increasing reflection risks 	3H	[REDACTED]	1L

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	<ul style="list-style-type: none"> Poor housekeeping around laser cutters increasing fire load and trip hazards Inadequate lighting, signage and demarcation in laser and UV work areas Insufficient noise, temperature or ventilation control affecting concentration and safe operation 		[REDACTED]	
12. Emergency Preparedness, Incident Response & First Aid	<ul style="list-style-type: none"> Delayed or ineffective response to eye exposure, skin burns or UV overexposure incidents Lack of clear emergency shutdown procedures for continuous and pulsed laser equipment Inadequate preparedness for fires arising from laser cutting or engraving operations Failure to capture, investigate and learn from laser near miss or incidents Insufficient first aid equipment and trained personnel familiar with laser related injuries 	3H	[REDACTED]	1L
13. Health Monitoring, Fatigue & Human Factors	<ul style="list-style-type: none"> Unrecognised visual strain or pre-existing eye conditions increasing susceptibility to laser damage Fatigue and reduced attention during prolonged laser monitoring or repetitive engraving tasks Human error in setup, focusing, material selection or parameter entry leading to unsafe conditions 	3H	[REDACTED]	1L

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	<ul style="list-style-type: none"> Insufficient consideration of individual photosensitivity or medications affecting UV tolerance Psychosocial factors (time pressure, production targets) leading to procedural shortcuts 		[REDACTED]	
14. Contractor, Supplier & Visitor Management	<ul style="list-style-type: none"> Contractors performing installation, maintenance or commissioning work on lasers without appropriate safety systems or training Suppliers conducting demonstrations of portable lasers or UV sources in uncontrolled conditions Visitors and clients entering laser-controlled areas without understanding risks or controls Inadequate coordination of WHS responsibilities where multiple PCBU's share a workplace 	3H	[REDACTED]	1L
15. Audit, Review & Continuous Improvement of Laser Safety System	<ul style="list-style-type: none"> Stagnant laser safety program that does not keep pace with new technology, materials or processes Failure to detect systemic weaknesses in controls due to lack of formal auditing Reliance on informal feedback instead of structured review of incidents, near misses and monitoring data Outdated risk assessments not reflecting current laser plant configuration or work practices 	3H	[REDACTED]	1L

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SAMPLE

EMERGENCY RESPONSE – CALL 000 FOR EMERGENCIES

Ensure to have an Emergency Management Plan in place as well as adequate numbers of trained first aid staff with easy access to fully stocked first aid kits, rescue equipment, material safety data sheets, adequate access to emergency communication equipment and fire-fighting equipment suitable for all classes of fire and ignition sources.

LEGISLATIVE REFERENCES

RELEVANT LEGISLATION AND CODES OF PRACTICE. DELETE THE LEGISLATIVE REFERENCES FOR ANY STATE THAT ARE NOT APPLICABLE

Queensland & Australian Capital Territory

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2011
 Legislation QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/work-health-and-safety-laws>
 Codes of Practice QLD: <https://www.worksafe.qld.gov.au/laws-and-compliance/codes-of-practice>
 Legislation ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/acts-and-regulations>
 Codes of Practice ACT: <https://www.worksafe.act.gov.au/laws-and-compliance/codes-of-practice>

Victoria

Occupational Health and Safety Act 2004
 Occupational Health and Safety Regulations 2017
 Legislation VIC: <https://www.worksafe.vic.gov.au/occupational-health-and-safety-act-and-regulations>
 Codes of Practice VIC: <https://www.worksafe.vic.gov.au/compliance-codes-and-codes-practice>

New South Wales

Work Health and Safety Act 2011
 Work Health and Safety Regulations 2025
 Legislation NSW: <https://www.safework.nsw.gov.au/legal-obligations/legislation>
 Codes of Practice NSW: <https://www.safework.nsw.gov.au/resource-library/list-codes-of-practice>

Western Australia

Work Health and Safety Act 2020
 Work Health and Safety Regulations 2022
 Legislation Western Australia: <https://www.commerce.wa.gov.au/worksafe/legislation>
 Codes of Practice WA: <https://www.commerce.wa.gov.au/worksafe/codes-practice>

Northern Territory

Work Health and Safety (National Uniform Legislation) Act 2011
 Work Health and Safety (National Uniform Legislation) Regulation 2011
 Legislation NT: <https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws>
 Codes of Practice NT: <https://worksafe.nt.gov.au/laws-and-compliance/codes-of-practice>

Safe Work Australia Links

Law and Regulation (All States): <https://www.safeworkaustralia.gov.au/law-and-regulation>
 Model Codes of Practice: <https://www.safeworkaustralia.gov.au/resources-publications/model-codes-of-practice>

South Australia

Work Health and Safety Act 2012 (SA)
 Work Health and Safety Regulations 2012 (SA)
 Legislation for SA: <https://www.safework.sa.gov.au/resources/legislation>
 Codes of Practice for SA: <https://www.safework.sa.gov.au/workplaces/codes-of-practice#COPs>

Model Codes of Practice

- Managing noise and preventing hearing loss at work
- Confined spaces
- Labelling of workplace hazardous chemicals
- Managing risks of hazardous chemicals in the workplace
- Welding processes
- First aid in the workplace
- Managing the risk of falls at workplaces
- Hazardous manual tasks
- Managing the risk of falls in housing construction
- Managing electrical risks in the workplace
- Demolition work
- Excavation work
- Work health and safety consultation, cooperation and coordination
- Managing the work environment and facilities
- How to manage work health and safety risks
- Managing risks of plant in the workplace
- Construction work

Tasmania

Work Health and Safety Act 2012
 Work Health and Safety (Transitional and Consequential Provisions) Act 2012
 Work Health and Safety Regulations 2012
 Work Health and Safety (Transitional) Regulations 2012
 Legislation for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/acts-and-regulations>
 Codes of Practice for TAS: <https://worksafe.tas.gov.au/topics/laws-and-compliance/codes-of-practice>

Details of permits, licenses or access required by regulatory bodies (add or delete as required):

- Permits from local council
- Authorisation to commence work
- Any required documents.