CNC Laser Cutter			
Business Name:		ABN:	
Business Address:			
Contact Person:	Phone:	Email:	

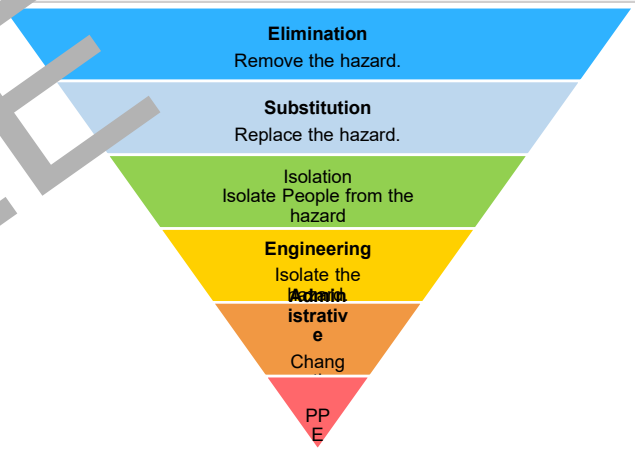
THIS RISK ASSESSMENT IS APPROVED BY THE PCBU OF THE PROJECT		
Under the Work Health and Safety Regulation (WHS Regulation), a person conducting a business or undertaking (PCBU) is required to ensure that a RISK ASSESSMENT is prepared before the proposed work starts.		
Full Name:		
Signature:	Title:	Date:

CLIENT OR PRINCIPAL CONTRACTOR DETAILS	SCOPE OF WORKS
Client:	
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
ALMOST CERTAIN	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4 ACUTE		
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED
POSSIBLE	1 LOW	2 MODERATE	3 HIGH	4 ACUTE	4 ACUTE	3H HIGH	Rev before work
UNLIKELY	1 LOW	1 LOW	2 MODERATE	3 HIGH	4 ACU	2M MO RATE	Ensure control measures in place.
RARE	1 LOW	1 LOW	2 MODERATE	3 HIGH	3 H	1L LOW	Monitor and keep records.

HIERARCHY OF CONTROLS



Risk Rating & Required Action:

4A	Stop work. The risk is intolerable. E inate the hazar redesign the activity before proceeding. A Safe Work Method Statement (SWMS) or hi er-level authorisati is required.
3H	Review and approve additional c rols b ask arts. Senior supervisor sign-off needed.
2M	Ensure all nominated controls are in ace and effe ive. 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. Governance, WHS Duties and Regulatory Compliance	• Lack of clear allocation of WHS duties for laser cutter oversight, leading to gaps in supervision and risk management • Failure to comply with WHS Act 2011 and associated regulations, codes of practice and Australian Standards for machinery and lasers • Inadequate consultation with workers, HSRs and contractors about laser cutter risks and changes to systems of work • Absence of formal WHS objectives and performance indicators for CNC laser cutter operations • Poor integration of laser cutter risks into the organisation's overall WHS management system and risk register	High	• Assign a PCBUs' representative (e.g. Operations or Engineering Manager) with documented responsibility and authority for CNC CO2 laser cutter WHS compliance and safe systems of work • Embed CNC laser cutter risks in the organisational WHS risk management procedure, including identification, assessment, control, and review in line with WHS Act 2011 and WHS Regulation • Reference relevant Australian Standards and guidance (e.g. AS/NZS 4024 series for machine safety, laser safety guidance, electrical safety standards) in internal policies and design specifications • Establish a formal consultation process (toolbox talks, WHS committee, HSR briefings) specifically addressing CNC laser cutter hazards, incident trends and proposed control changes • Include laser cutter WHS performance indicators (e.g. number of incidents, near misses, completion of maintenance, training compliance) in regular management review meetings • Ensure procurement, engineering, maintenance and WHS functions are involved in key decisions about the installation, modification or relocation of CNC laser cutters • Maintain current copies of relevant licences, registrations, test certificates and vendor documentation, and keep them accessible to workers and supervisors • Periodically commission independent WHS or engineering audits of the CNC laser cutter system to verify compliance with legislation and standards	Medium
2. Procurement, Design and Specification of CNC CO2 Laser Cutter	• Selection of a laser cutter that lacks adequate built-in guarding, interlocks or safety functions for Australian workplace conditions • Imported equipment that does not comply with Australian Standards, electrical requirements or laser safety classifications • Inadequate specification of extraction and filtration capacity for fumes, smoke and particulates generated by CO2 laser cutting • Failure to specify appropriate emergency stop, isolation and lockout capabilities at design/procurement stage • Lack of compatibility between the laser cutter control systems, software and existing organisational IT and safety systems	High	• Develop a formal procurement specification for CNC CO2 laser cutters that mandates compliance with AS/NZS 4024 machine safety standards and relevant laser safety requirements • Require suppliers to provide documented evidence of compliance (e.g. conformity statements, test reports, CE/Aus compliance, electrical certifications) and review them before purchase • Incorporate safety functionality requirements into tender and purchase documents, including fully enclosed laser cabinet, interlocked access doors, key switch, emergency stop circuits and appropriate guarding • Specify integrated fume extraction, filtration, and venting systems sized for maximum cutting load, types of materials used and duration of operation, in line with WHS Regulation requirements for airborne contaminants • Require that the machine be capable of lockout/tagout via main isolator and that emergency stops are fail-safe, clearly labelled and tested as part of commissioning • Ensure procurement documents require complete manufacturer documentation including operating manual, safety instructions, maintenance schedules and training materials • Involve WHS advisors, electrical engineers and end users in the evaluation of potential suppliers and demonstration units before final selection • Include obligations in supplier contracts for commissioning support, training, and early-life safety inspections following installation	Low

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3. Installation, Workshop Layout and Environmental Controls	• Poor workshop layout leading to restricted access to emergency stops, isolators or exits during an incident • Inadequate ventilation or fume extraction causing accumulation of hazardous fumes, smoke or odours from laser cutting • Incorrect electrical installation or overloading of circuits creating fire and electric shock risks • Incompatible location near flammable materials, incompatible processes or foot traffic routes increasing likelihood and consequences of incidents • Insufficient lighting, noise control or visibility around the laser cutter affecting supervision and safe operation • Inadequate segregation between the laser cutter and other work areas, exposing bystanders to emitted radiati or ejected fragments from catastrophic failure	High	• Implement an installation plan that considers safe ccess, material flow, emergency egress, and clear separation from incompatible processes such welding or flammable storage • Ensure electrical installation is designed a certified b licensed electrician in accordance with Australian electrical standards, including ded ted ci its and appropriate protection devices • Design and commission a local exhaust ventila n and filtratio ystem specifically for the CO2 laser cutter, with exhaust routed sa y outdoors or thro h adeq e filtration to protect indoor air quality • Provide clear access to main is tor, emergency s , fire extinguishers and first aid facilities, with minimum clearanc ista s mai ined and marked on the floor • Install appr ate fire det ion and uppr on systems based on a fire risk assessment, including suitable porta extinguis rs located but not directly above the machine • Use ical ba emarcation lines or screens to segregate the laser cutter from general walkways and ot rkstat s, while preserving visibility for supervision • Ensur ade ate ge al and task lighting so operators and supervisors can clearly see the control panel, w k ar and su ounding environment • D ment instal tion details, including as-built drawings of services, ventilation and access points, and integra em into emergency planning and maintenance procedures	Medium
4. Laser Safety Management and Radiation Control	• Exposure to hazardous radiation (direct beam, reflecti or scattered radiation) due to in equate enclosure integrity or interloc failures • Defeating or bypass interlocks, guards or safety switches for convenience or maintenance tas • Lack of formal classification and documentation of the laser system and associated control measures • Inappropriate or non-compliant laser protective eyewear and inadequate labelling of laser hazards • Poor management of software or firmware changes that may affect laser safety functions or limit settings • Absence of clear access control to the laser cutter area, allowing untrained persons or visitors to be exposed to laser risks	High	[redacted]	Medium

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			[redacted]	
5. Fume, Smoke and Airborne Contaminant Management	• Generation of hazardous fumes, gases and particulates from cutting, engraving or marking various materials (e.g. plastics, timber, composites) • Inadequate assessment of materials being cut, leading to unintended release of toxic or corrosive substances • Poorly maintained extraction and filtration systems resulting in reduced performance and build-up of contaminants • Uncontrolled discharge of fumes to the external environment causing environmental or public exposure issue • Failure to monitor and manage worker exposure to airborne c[redacted]ants over time	High	[redacted]	Medium
6. Fire, Explosion and Thermal Risk Management	• Ignition of combustible m[redacted]ials (workpieces, residues, extraction filters) within the laser cutter enclosure or ducting • Accumulation of flammable dusts or offcuts in the work area, extraction system or filters increasing fire load • Inadequate selection or placement of fire extinguishers and inappropriate response procedures for laser-related fires • Overheating of mechanical or electrical components due to inadequate maintenance or cooling	High	[redacted]	Medium

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	• Uncontrolled use of materials with flammable substrates, coatings or laminates in the laser cutter		[redacted]	
7. Electrical, Mechanical and Machine Safeguarding Systems	• Electric shock or arc incidents arising from internal faults, improper repairs or damaged cables and plug connections • Mechanical entrapment, crushing or impact from moving axes, gantries or work tables if guarding or interlocks fail • Unexpected start-up [redacted] machine during cleaning, maintenance or troubleshooting activities • Deficient or undocumented lockout/tagout procedures for isolation during non-routine tasks • Control system failures (software or hardware) leading to uncontrolled movement or laser activation	High	[redacted]	Medium
8. Software, Data Integrity and Computerised Control Systems	• Incorrect or corrupted CNC programs causing unexpected movement paths, collisions or off-limit operations • Uncontrolled software updates, patches or configuration changes affecting machine safety parameters	High	[redacted]	Medium

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	• Cybersecurity vulnerabilities in network-connected laser cutters leading to unauthorised access or manipulation of control systems • Inadequate management of design file approval, version control and storage, leading to repeated use of unsafe or unverified programs • Operator over-reliance on software simulation without adequate verification of physical clearances and fixture integrity		[redacted]	
9. Training, Competency and Supervision	• Operators and supervisors lacking adequate knowledge of laser cutter hazards, control measures and emergency responses • Inconsistent on-the-[illegible] training leading to variable practice and normalisation of unsafe behavio[illegible] • Insufficient supervis[illegible] of new or young workers and contractors usin[illegible] or working near the laser cutter • No formal competency assessment or re-assessment after incidents, equipment changes or extended absences • Limited understanding of software interfaces, error messages and alarm conditions resulting in incorrect responses	High	[redacted]	Medium

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10. Procedures, Work Instructions and Safe Systems of Work	• Lack of clear, standardised procedures for normal operations, abnormal conditions and emergency shutdowns • Reliance on informal knowledge transfer, leading to inconsistent practices between shifts and operators • Outdated work instructions that do not reflect current machine configuration, materials or control measures • Procedures that are too complex or poorly formatted, increasing the likelihood they will not be followed • No defined process for reviewing and updating documentation after incidents, changes or audit findings	High	[redacted]	Medium
11. Maintenance Systems, Inspection and Asset Management	• Breakdown of cri al safet s (interlocks, extracti gency st s) due to inadequate preventative maintenance • Reliance on reactive rep only, increasing the risk of operating with known defects • Incomplete or inaccurate maintenance records leading to missed inspections or overdue tasks • Use of non-genuine parts or unauthorised modifications compromising safety performance • Maintenance tasks carried out by unqualified personnel who are unfamiliar with laser cutter hazards	High	[redacted]	Medium

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			[redacted]	
12. Materials Management, Storage and Handling Systems	• Uncontrolled introduction of incompatible or hazardous materials (e.g. chlorine-containing plastics, unknown composites) into the laser cutter • Poor storage of raw materials and offcuts leading to increased fire load, trip hazards and manual handling risks • Inadequate linkage between purchasing, stores and WHS in assessing new materials for laser suitability • Lack of traceability for materials used, complicating incident investigations or exposure assessments • Excess accumulation of flammable dusty waste close to the machine and extraction outlets	edium	[redacted]	Low
13. Ergonomics, Workload and Human Factors Management	• Poor workstation design around the CNC laser cutter leading to awkward postures, repetitive movements and manual handling injuries • High cognitive load from complex computerised interfaces, alarms and software workflows contributing to operator error	Medium	[redacted]	Low

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	• Fatigue or time pressure leading to skipped checks, unsafe overrides or poor decision-making • Insufficient consideration of human–machine interface design when implementing software or hardware changes • Inadequate accommodation of workers with varying physical capabilities or experience levels		[redacted]	
14. Incident Reporting, Emergency Response and First Aid Systems	• Delayed or ineffective response to fires, laser exposure, fume incidents or mechanical failures due to unclear emergency procedures • Under-reporting of near misses and minor events, limiting opportunities for systemic improvement • Lack of first aid capability for burns, inhalation exposure or eye injuries associated with laser cutter incidents • Confusion about roles and responsibilities during an emergency resulting in uncoordinated actions • Failure to investigate incidents thoroughly enough to identify root causes and system failures	High	[redacted]	Medium
15. Contractor, Visitor and Student Management	• Contractors performing installation, maintenance or repairs without understanding site-specific laser cutter risks and controls • Visitors or students entering the laser cutter area without adequate supervision or awareness of hazards	Medium	[redacted]	Low

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	• Educational or demonstration use of the laser cutter with relaxed controls, increasing risk of incident • Lack of clear responsibility and authority when multiple PCBUs or organisations share the same laser cutter facility		[redacted]	

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

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-of-codes-of-practice

Northern Territory
Work Health and Safety (National Uniform Legislation) Act 2011
Work Health and Safety (National Uniform Legislation) Regulations 2011
Legislation NT: https://worksafe.nt.gov.au/laws-and-compliance/workplace-safety-laws
Codes of Practice NT: https://worksafe.nt.gov.au/forms-and-resources/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

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.

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

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

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

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