Electric Welding Arc MIG TIG and Spot Welding

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:

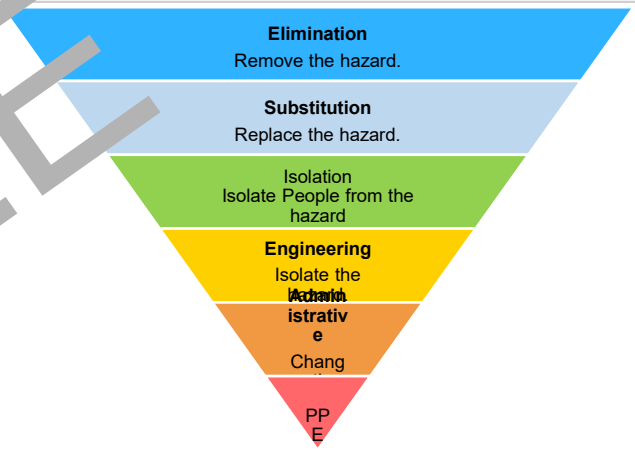
CLIENT OR PRINCIPAL CONTRACTOR DETAILS

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
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. WHS Governance, Duties and Consultation	• Lack of clear allocation of WHS officer and PCBU duties for welding activities under WHS Act 2011 • Inadequate consultation with Health and Safety Representatives (HSRs) and welders about welding risks and changes to processes • Failure to integrate electric welding (MIG, TIG, SMAW, flux core, submerged arc, spot, RF/HF, cobot and robot systems) into the organisation's WHS management system • No formal process to review incidents, near misses or regulator safety alerts relating to welding operations • Insufficient consideration of welding-specific risks in Board / senior management WHS reporting and due diligence activities	4A	• Establish and document a welding safety gov[illegible]ance framework that clearly defines PCBU, officer and worker duties in line with WHS Act 2011 and [illegible]HS Regulation • Ensure welding risk management is incorp[illegible]ed int[illegible]e organisation's WHS policy, objectives and consultation arrangements, including regular t[illegible]talks with welders and maintenance staff • Set up a formal process to c[illegible]sult with HSRs a[illegible] welding [illegible]rators on introduction of new welding equipment (e.g. cobot welding [illegible]ls, robot welders, [illegible]/HF[illegible]elders, PAPR welding helmets, spot welders) and substantial proce[illegible]hanges • Include weldi[illegible]isks, inci[illegible]nt stat[illegible]cs, and st[illegible]us of corrective actions in WHS KPI reports to officers to support d[illegible]iligence ob[illegible]ations • Impl[illegible]ent a d[illegible]ument[illegible] management-of-change (MOC) procedure for new or modified welding proce[illegible]and eq[illegible]ent, with risk assessment and HSR sign-off required • Sche[illegible]le [illegible]eriodic [illegible]rnal audits of the welding safety management system against Safe Work Australia welding [illegible]uid[illegible]es and [illegible]elevant Australian Standards (e.g. AS/NZS 1674 series, AS 1674.1, AS/NZS 3814 wh[illegible]re ap[illegible]cable)	3H
2. Competency, Licensing and Training Systems	• Inadequate verification of welder competency for different processes (MIG, TIG, SMAW, flux core, submerge arc, spot welding, RF/[illegible]we[illegible]ng, pin welding, manual ar[illegible]elding, gas metal arc welding, metal[illegible]as tungsten arc welding) • No structured training on UV expos[illegible]e, arc flash protection, flash protectio[illegible] safety, electrical hazards, RF/HF exposure and fumes from welding operations • Lack of competency assessment for use of specialised equipment such as robot welder, cobot welding cells, PAPR welding helmets and RF/HF welders • Informal "buddy" training with no documented learning outcomes or assessment of safe work practices • No refresher training program to maintain awareness of new technology, standards and legislative changes	4A	• Develop a competency framework for all welding roles, defining minimum qualifications, experience and unit standards for each welding process and machine type • Require formal training and verification of competency (VOC) before authorising workers to perform electric welding, spot welding operations, RF/HF welding, and to operate robot and cobot welders • Implement an induction program covering welding-specific risks including UV exposure from welding operations, electrical shock, RF/HF radiation, fumes, fire and explosion risks, and clean-up practices (slag removal, wire brushing, post-weld heat treatment) • Establish a documented refresher training schedule (e.g. every 2–3 years or on introduction of new plant) addressing updated procedures, incidents, and changes in Australian Standards or manufacturer guidance • Train supervisors and leading hands in hazard recognition specific to welding (e.g. poor flash protection, missing welding enclosure barriers, incorrect selection of PAPR welding helmets, incorrect earthing of electric welders) • Maintain training and competency records in a central WHS system and link authorisations to specific welding processes and plant types	3H

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	• Supervisors not trained to monitor and enforce correct PPE use and safe setup of welding enclosures and barriers			
3. Plant Procurement, Design and Selection of Welding Equipment	• Procurement of electric welders, MIG welders, TIG sets, manual arc welders, flux core welders, submerged arc machines, spot welders, pin welding machines and RF/HF welders that are not compliant with relevant Australian Standards • Failure to consider inherent safety features (e.g. voltage reduction devices, interlocks, emergency stops, guarding, flash protection) when purchasing welding equipment and robot welders • Selection of welding plant that is incompatible with existing power supply capacity or earthing systems, increasing risk of electrical faults • Insufficient specification of welding enclosure barriers, screens and local exhaust ventilation with new plant purchases • Inadequate assessm… …gonomic risks (e.g. cable wei…t, gun handle design, manipulat… for welding brackets and fram… durin… …d procurement • No requirement for suppliers to pr…de technical documentation, safet… instructions and maintenance schedules at the time of purchase	4A	• Establish a forma… …ndard for welding equipment that mandates compliance with relevant Australian and … standar… and S… Work A…tralia guidance on welding • Include safet… criteria in t…der and p…sing documents for all welding plant (e.g. voltage reduction devic… or man… arc…ding, integrated flash protection safety features, fail-safe interlocks on spot welde… …arding… …obot welders and RF/HF welders) • Requ… p… purcha… risk assessments for new or upgraded welding systems, including cobot welding cells, w…ding …nclosu… and post-weld heat treatment equipment, involving WHS, engineering and end …sers • Sp…ify …andatory engineering controls such as welding screens, welding enclosure barriers, fume extracti… …nd isolation transformers as part of the plant package • …sure suppliers provide detailed operating manuals, safety instructions, recommended maintenance sch…dules and training materials, and that these are reviewed before commissioning • Implement a pre-acceptance inspection checklist to verify that all safety features and documentation are provided and functional before plant is signed into service	2M
4. Plant Registration, Inspection, Maintenance and Isolation Systems	• Lack of a plant register for all electric welders, MIG/TIG units, metal resistance welding machines, metal shielded metal arc welding machines, submerged arc systems, RF/HF welders and spot welding machines • Inadequate preventative maintenance systems for welding power sources, cables, torches, clamps and robot/cobot welding cells • No formal test-and-tag or electrical inspection program for welding leads,	4A	[redacted]	2M

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	extension cords and auxiliary power tools used for slag removal or wire brush cleaning slag • Absence of lockout/tagout (LOTO) procedures for welding plant during maintenance, repair or modification • Continued use of damaged welding equipment (e.g. cracked insulation, exposed conductors, faulty earth clamps, damaged spot welder tongs) due to poor defect reporting and repair systems • Failure to inspect and maintain RF/HF shielding and interlocks on radio frequency and high frequency welders		[redacted]	
5. Electrical Safety and Energy Isolation Management	• Inadequate earthing and bonding of electric welders, metal structures and workpieces, leading to shock or arc faults • Overloading of circuits or use of inappropriate extension leads and power boards for high-current welding equipment • Lack of system for verifying correct voltage, phase, and capacity of power supplies before connecting welding arc, MIG, TIG or resistance spot welding machines • Absence of procedures for managing stored energy in capacitive and inductive systems in RF/HF welders and spot welders • Improper use of welding return leads (e.g. routing near control cables or communication lines) creating stray current hazards • No documented procedures for electrical work on welding equipment by qualified electricians	4A	[redacted]	2M
6. Welding Area Layout, Enclosures and Access Control	• Poorly designed welding bays without adequate separation between manual welding, cobot welding and robot welding cells	4A	[redacted]	2M

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	• Absence of welding enclosure barriers, screens or curtains to control UV exposure from welding operations and protect nearby workers from flash • Inadequate access control and interlocking around robot welder and cobot welding cells, increasing risk of entrapment or collision • Welding conducted in ad-hoc locations without control of combustibles, ventilation or traffic management • Insufficient space for safe handling of large welding brackets and frames, leading to crush and strain hazards • No designated and signposted clean and dirty zones for pre-weld preparation, weld execution and cleanup after welding (including slag and spatter removal)		[redacted]	
7. Fume, Gas and Fire/Explosion Risk Management	• Inadequate local exhaust ventilation and general ventilation for gas metal a welding, flux core welding, submerged arc welding and manual arc welding, leading to harmful fum and gas exposure • Failure to control e and ex risks where welding taken n flammable vapours, gases, coatings combustible materials • No system for assessing ng fume composition (e.g. during stainless steel, galvanised or specialised alloy work) and implementing appropriate controls • Insufficient procedures for hot work permits for welding in hazardous or confined spaces, or on tanks and vessels • Inadequate control of fume and hot particles generated during cleanup after welding, such as remove slag from a weld and wire brush cleaning slag • Poor cylinder management for shielding gases, including unsecured	4A	[redacted]	2M

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	gas cylinders and lack of leak-check systems			
8. PPE, PAPR Welding Helmets and Flash Protection Systems	• Workers conducting welding tasks without appropriate PPE (e.g. inadequate welding helmets, gloves, protective clothing, respiratory protection, eye and face protection) • Incorrect selection, fit or maintenance of PAPR welding helmets for high-fume processes such as flux core welding and gas metal arc welding • Lack of systematic approach to flash protection safety for bystanders and adjacent workers in shared workshop spaces • No documented process for inspection and replacement of PPE exposed to UV, spatter and slag during welding and cleanup operations • Inconsistent use of PPE during ancillary tasks such as remove slag fr… a weld and wire brush cleaning slag	4A	[redacted]	2M
9. Safe Work Procedures and Integration with SWMS	• Lack of overarching pr…es describing safe syst…s of work for welding that integr…e multiple processes (MIG, TIG, SMAW…ux core…ged arc, spot welding, R…ding, c…ot and robot welding) • Reliance solely on task-level SW…S without higher-level syste…trols and management guidance • Inconsistent procedures for specialised tasks such as perform spot welds, pin welding, post-weld heat treatment, and welding brackets and frames • No formal review process to ensure SWMS and procedures remain current with technology, legislation and standards • Confusion among workers and supervisors about responsibility for authorising and implementing welding SWMS	3H	[redacted]	2M

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10. Automation, Cobot and Robot Welding Safety Management	• Inadequate risk assessment of robot welder and cobot welding systems, including interaction with human workers • Failure of safeguarding systems (e.g. light curtains, pressure mats, interlocks) due to poor maintenance or bypassing • Lack of clear procedures for programming, teaching and fault recovery for robot welders and cobots • Insufficient training for operators and maintenance personnel on the specific hazards of automated welding cells • Uncontrolled changes to welding programs, fixtures or tooling for automated cells, affecting safety distances and reach envelopes	4A	[redacted]	2M
11. Manual Handling, Ergonomics and Work Organisation	• Poor manual handling systems for moving heavy components, jigs and welding brackets and frames in and ou of welding areas • Ergonomically poor w rkstation design for MIG, TIG, flux c re and manual arc welding resulting i awkward postures and repetitive strai • No rotation or job design to manag fatigue and repetitive tasks such a continuous weld runs and e spot welding operations • Inadequate provision of handling aids for cleanup after welding, including manoeuvring large welded assemblies for slag removal and wire brush cleaning slag • Insufficient planning for shared use of cranes, forklifts and positioners, creating congestion and interaction risks in welding areas	3H	[redacted]	2M
12. Hazardous Substances, RF/HF Exposure and Post-	• Inadequate management of hazardous substances associated with fluxes, shielding gases, coatings, cleaners and consumables used in flux core welding,	4A		2M

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Weld Heat Treatment Control	submerged arc welding and gas metal arc welding • No formal system to assess and control exposure to radio frequency and high frequency emissions from RF/HF welders • Insufficient procedures for safe setup and monitoring of post-weld heat treatment operations (e.g. local heating, ovens, insulated blankets), leading to burn, fire or thermal stress hazards • Poor storage and labelling of chemicals and fluxes used in welding processes • Lack of medical surveillance or exposure monitoring where there is potential for significant fume or RF/HF exposure		[redacted]	
13. Housekeeping, Cleanup After Welding and Waste Management	• Poor housekeeping in welding areas leading to accumulation of slag, offcut wire, spatter and consumable waste • Uncontrolled methods for cleanup after welding, including removal of slag from a weld and wire brushing, cleaning slag, creating slip, trip and particle hazards • Inadequate systems for collection and disposal of metal dusts, slag and spent welding consumables, increasing fire risk and exposure • Lack of designated storage for welding tools and equipment used in cleanup, causing clutter and damage • No regular inspection regime to verify cleanliness and orderliness of welding work areas	3H	[redacted]	1L
14. Emergency Preparedness, Incident Response and First Aid	• Inadequate emergency response planning for welding-related incidents such as burns, electric shock, eye flash, fire or fume overexposure • Lack of accessible and suitable firefighting equipment (e.g. appropriate	3H	[redacted]	2M

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	extinguishers for electrical and metal fires) in welding areas • Insufficient first aid resources and trained first aiders familiar with welding-specific injuries (flash burns, slag in eye, RF/HF exposure) • Poor incident reporting and investigation processes for welding near misses and equipment failures • No arrangements with external emergency services that consider location and hazards of welding operations		[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