High Pressure Gas

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:

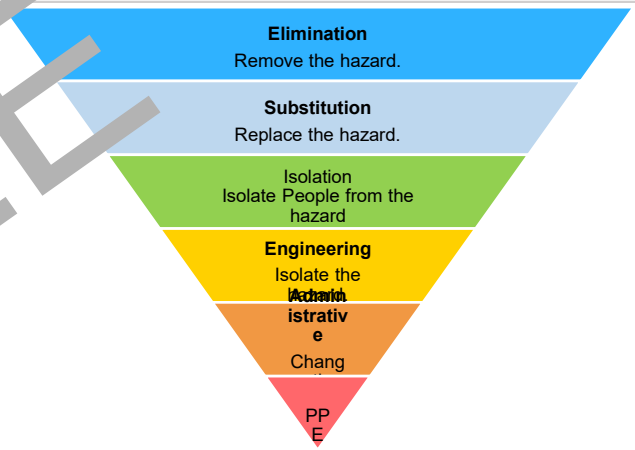
CLIENT OR PRINCIPAL CONTRACTOR DETAILS

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. Governance, WHS Duties and Legislative Compliance	• Failure to recognise high pressure gas as a hazardous plant and dangerous good under WHS Act 2011 and WHS Regulations • Absence of a documented WHS management system specifically addressing high pressure gas risks • Lack of formal PCBU due diligence processes for oversight of high pressure gas systems • No clear allocation of WHS roles, responsibilities and accountabilities for high pressure gas ownership, operation and maintenance • Inadequate consultation with workers and Health and Safety Representatives (HSRs) on changes to gas systems, equipment or procedures • Incomplete or inaccurate safety documentation (e.g. Safety Data Shee compliance certificates, plant registration, design registrations where required) • Failure to conside nterface risks where multiple PC ls share act with the gas systen tors, tenants, suppliers) • Poor change management for modifications to gas syst t pressures, gas types or supply arrangements	Extreme	• Develop and implement a documented WH Manage nt System that explicitly includes high pressure gas as a critical risk area, aligned with the WH Act 011 and relevant WHS Regulations and Codes of Practice • Define and document PCBU vernance arrange nts f igh pressure gas, including board-level or senior management oversight, appetite, and min engineering and procedural standards • Assign clear ro and re onsibi s (e.g. Gas System Owner, Plant Controller, Permit Authority, Maintenance anager) in p ition de ription and the WHS accountability matrix • Establish a fo al WHS gal register ering high pressure gas and dangerous goods obligations, and revie t least nnu or when standards or legislation change • Imple e a struc ed change management procedure (MOC) for any modification to the gas system, operati pr sures, composition, isolation philosophy, or control system software • Ensure p-to- e Safety Data Sheets (SDS) are readily available and integrated into risk assessments, e gen planni g and training material • Maint l required plant design approvals, plant registrations, pressure vessel certifications and rd-party inspection reports, and track their currency in a central compliance register • Im lement formal consultation mechanisms (HSR meetings, toolbox talks, design reviews) to involve workers and contractors in high pressure gas risk assessments and control decisions • Establish and implement a documented policy that prohibits unapproved or ad-hoc connections, temporary hoses or alterations to high pressure gas systems • Periodically commission independent WHS or engineering audits of the high pressure gas system governance, documentation and compliance	Medium
2. High Pressure Gas System Design and Engineering Controls	• Inadequate pressure rating or incorrect selection of piping, valves, regulators and fittings relative to maximum allowable working pressure • Absence or incorrect sizing of pressure relief devices leading to over-pressurisation and catastrophic failure • Poor layout and segregation of gas lines, regulators and manifolds	Extreme	• Adopt recognised engineering standards for high pressure gas systems (e.g. AS/NZS 1596, AS 1210, AS 4343, relevant gas and pressure piping standards) and embed them in engineering specifications • Require that all high pressure gas systems are designed, reviewed and signed off by a competent engineer with experience in pressure systems and the specific gas type • Implement formal design verification and, where required, independent design review for critical systems including verification of pressure ratings, relief capacity and load cases • Standardise on approved materials, fittings and lubricants compatible with the gas type, pressure and temperature conditions, and document them in engineering standards and approved parts lists	Low

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	increasing exposure to impact, fire, heat or incompatibility with nearby plant • Use of inappropriate materials (e.g. incompatible metals, seals, lubricants) causing accelerated corrosion, embrittlement or leakage • Insufficient ventilation and gas dispersion design resulting in accumulation of flammable, oxidising or asphyxiant gases • Lack of automatic isolation and emergency shut-off systems for major leaks, pipeline rupture or fire • Inadequate separation distances from ignition sources, hot work areas or confined spaces • Insufficient consideration of mechanical damage risks from vehicles, forklifts, dropped objects or vibration • Poorly designed control and instrumentation (e.g. no redundancy, inaccessible gauges, lack of remote pressure indication and a[illegible]) • No formal design [illegible]ification or failure mode and effects [illegible]alysis (FMEA) for high pressure gas [illegible]tallati[illegible]		• Incorporate pressure relief valves, burst discs and over-pressure protection devices in accordance with engineering standards and ensure discharge points are directed to safe locations • Design pipework routing and supports to minimise [illegible]echanical damage, vibration and fatigue, with physical protection (bollards, barriers, guards) w[illegible]e exposure to traffic or impact exists • Integrate fixed gas detection, pressure m[illegible]oring, and a[illegible]omatic emergency shut-off valves in high-risk areas, linked to alarms, control systems and [illegible]ergen[illegible] procedures • Ensure plant layout provides adequate separa[illegible] distances fro[illegible] ignition sources, electrical equipment, hot work areas, air intakes ar[illegible] confined spaces, [illegible]erencing [illegible]evant standards and fire authority guidance • Provide adequate [illegible]or me[illegible]nical ventilation i[illegible] all locations where high pressure gas is stored, distributed or us[illegible], with pe[illegible]rmanc[illegible] criteria do[illegible]mented and periodically validated • Implement p[illegible]t design d[illegible]umentati[illegible]dards including P&IDs, line lists, cause-and-effect charts, contro[illegible]gic dia[illegible]ms a[illegible] equipment da[illegible]asheets and maintain them under document control • Adop[illegible]a[illegible]rmal s[illegible]y in design process that considers worst-case failure scenarios, energy release, explos[illegible]n/i[illegible] potenti[illegible] and occupancy of surrounding areas	
3. Procurement, Installation and Commissioning of High Pressure Gas Plant	• Procurement of non-compliant or unsuitable cylinders, regulators, h[illegible]es or components due to co[illegible] purchasing decisions • Use of suppliers, installers or contractors who lack competency in high pressure gas systems • Inadequate pre-delivery verification of plant certifications, test reports and design compliance • Improper installation practices including incorrect torqueing, support spacing, routing or regulator configuration	High	• Develop procurement standards and technical specifications for all high pressure gas equipment that mandate compliance with relevant Australian Standards and WHS legislation • Establish an approved vendor list for high pressure gas suppliers, installers and inspectors based on demonstrated competency, certifications and performance history • Require suppliers to provide certificates of conformity, pressure test certificates, material traceability and design data for all critical components prior to acceptance • Implement a formal pre-installation design and constructability review involving engineering, WHS and end-users to verify that proposed equipment and layout meet risk and usability requirements • Mandate that installation and commissioning of high pressure gas systems are completed by competent and licensed personnel following documented installation procedures and OEM guidance • Introduce commissioning checklists and test procedures covering leak tests, proof pressure tests, function tests of alarms, interlocks and emergency shutdowns, and verification of relief devices	Low

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SPECIFIC WORK STEPS	HAZARDS THAT MAY ARISE	INITIAL RISK	SPECIFIC MEASURES TO BE PUT IN PLACE TO ELIMINATE OR CONTROL THE RISKS	RESIDUAL RISK
	• Failure to conduct systematic pre-commissioning checks and pressure testing prior to introducing gas • Absence of commissioning protocols and sign-off, including verification of interlocks, alarms and emergency shutdown systems • Lack of integration between original equipment manufacturer (OEM) instructions and site-specific WHS and engineering standards • Poor management of temporary installations, mobile gas systems or hire equipment • Failure to record as-built conditions and changes during installation, resulting in inaccuracies in drawings and risk assessments		• Require written commissioning reports, including test results, deviations and corrective actions, and ensure sign-off by a competent engineer and WHS representative where applicable • Capture and control as-built drawings, P&IDs, equipment tags and line numbering after installation and ensure they are uploaded to the central document management system • Implement specific controls for temporary and mobile gas installations, including risk assessments, pre-use inspections, time-bound permits and commissioning procedures • Link procurement processes to the organisation's risk register to ensure that any high-risk plant purchase triggers a formal WHS review and approval workflow	
4. High Pressure Gas Storage and Inventory Management	• Excessive inventory of high pressure gas on site increasing the consequence of fire, explosion or mass leakage events • Inadequate segregation of incompatible gases (e.g. flammable gases and oxidising gases and other dangerous goods • Improper cylinder securing, storage orientation or racking leading to fall, mechanical damage or valve shear • Lack of system to track cylinder ownership, testing dates and hydrostatic test currency • Uncontrolled accumulation of empty or near-empty cylinders and associated confusion during emergencies • Inadequate controls for outdoor storage exposure to heat, vehicle impact or vandalism • Poorly defined responsibilities between the organisation and gas supplier for storage area safety and inspection	High	[redacted]	Low

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			[redacted]	
5. Operations Management, Procedures and Work Authorisation	• Lack of formal operating procedures for use of high pressure gas systems and associated plant • Reliance on informal knowledge and custom and practice rather than documented safe operating limits • Unauthorised operation, adjustment of regulators or bypassing of safety devices by untrained personnel • Inadequate management of work on or near pressurised systems, including absence of permit to work for intrusive tasks • Poor communication and handover processes between shifts and work groups regarding system status and isolations • Failure to control simultaneous operations (SIMOPS) where hot work, confined space entry or other high-risk tasks occur near high pr[redacted] gas systems	Extreme	[redacted]	Medium
6. Training, Competency and Supervision	• Inadequate traini[redacted] of workers supervisors and co[redacted] high pressure gas hazards and safe syste[redacted] of work • Lack of formal compete[redacted] assessment for personnel operating, maintaining or designing high pressure gas equipment • Insufficient supervision, especially for new, young or inexperienced workers • Limited awareness of the specific properties and health effects of different gases (flammable, toxic, oxidising, asphyxiant) • Failure to provide refresher training or update training when plant or procedures change	High	[redacted]	Low

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	• Over-reliance on third-party vendors for training without verifying content and competency outcomes		[redacted]	
7. Inspection, Testing, Maintenance and Asset Integrity	• Degradation of cylinders, vessels, piping, hoses and regulators leading to leaks, ruptures or pressure loss • Failure of pressure relief devices due to blockage, incorrect set points or lack of testing • Corrosion, fatigue, vibration damage or mechanical impact not identified in time due to inadequate inspection regimes • Inadequate management of defects and temporary repairs, including use of non-approved components or clamps • Missing or overdue statutory inspections, tests and recertifications fo pressure equipment • Poor maintenanc ocumentation, leading to uncerta y about plan condition and histo	Extre	[redacted]	Medium
8. Monitoring, Instrumentation and Alarm Management	• Failure to detect leaks, over-pressure events or abnormal conditions due to lack of monitoring or defective instrumentation • Alarm overload or nuisance alarms leading to operator desensitisation and missed critical warnings • Uncalibrated or poorly maintained gas detectors and pressure sensors providing false or misleading information • Inadequate visibility of system status for remote or after-hours operations	High	[redacted]	Low

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	• Insufficient analysis of alarm and trip events to identify underlying systemic issues		[redacted]	
9. Contractor and Supplier Management	• Contractors performing installation, maintenance or inspection work on high pressure gas systems without appropriate competency or supervision • Poor coordination between multiple PCBUs (host employer, principal contractor, gas supplier) leading to gaps in control of high pressure gas risks • Insufficient communication of site-specific hazards, procedures and emergency arrangements to visiting technicians and delivery drivers • Inadequate verification [illegible]tractor adherence to WHS [illegible] technical standards for high [illegible]essure gas • Contractual arran[illegible] on cost and time but do not adequate define safety performance requirem[illegible]ts	High	[redacted]	Medium
10. Emergency Preparedness and Response	• Delayed or ineffective response to high pressure gas leaks, line ruptures, fires or explosions • Lack of clear, practised emergency procedures specific to the types of gases present • Inadequate emergency isolation points or poorly identified emergency shut-off controls • Insufficient coordination with emergency services and neighbouring businesses regarding high pressure gas risks	Extreme	[redacted]	Medium

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	• Inadequate provision and maintenance of emergency equipment (e.g. breathing apparatus, fire suppression, spill control for cryogenic gases) • Poor communication systems for alerting workers, contractors and visitors during a gas-related emergency		[redacted]	
11. Documentation, Information Management and Labelling	• Outdated or inaccessible documentation leading to incorrect assumptions about system design, operating limits or current plant status • Inadequate labelling of gas lines, cylinders, manifolds and isolation points causing errors in operation, isolation or emergency response • Loss of critical records such as inspection reports, design calculations and risk assessments • Inconsistent or conflicting information between P&IDs, procedures and control system displays	High	[redacted]	Low
12. Incident Reporting, Investigation and Continuous Improvement	• Under-reporting of near misses, minor leaks and unsafe conditions related to high pressure gas • Inadequate investigation of incidents leading to repeat events and unaddressed systemic causes • Failure to share learnings from internal and industry high pressure gas incidents across the organisation • Lack of performance indicators to monitor high pressure gas safety performance over time	High	[redacted]	Low

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			[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