

**Medical Gas Pipeline Installation and Testing**

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			<b>Elimination</b> Remove the hazard.	
LIKELY	2 MODERATE	3 HIGH	3 HIGH	4 ACUTE	4 ACUTE	4A ACUTE	DO NOT PROCEED	<b>Substitution</b> 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.	<b>Engineering</b> 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:	
<b>4A</b>	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.
<b>3H</b>	Review and approve additional controls before task starts. Senior supervisor sign-off needed.
<b>2M</b>	Ensure all nominated controls are in place and effective. Proceed with caution; monitor conditions.
<b>1L</b>	Proceed, following standard operating procedures. Monitor and keep records.

  

Consequence Scale:			
Consequence	People (injury/illness)	Project / Assets	Compliance / Reputation
<b>Catastrophic</b>	Fatality or permanent total disability	project shutdown	Significant regulator intervention; criminal prosecution
<b>Major</b>	Serious injury/illness (hospital > 5 days)	critical delay	Improvement notice; major media coverage
<b>Moderate</b>	Medical-treatment injury; lost-time > 1 day	moderate delay	Minor breach; adverse client comment
<b>Minor</b>	First-aid only, no lost time	negligible delay	Isolated non-conformance
<b>Insignificant</b>	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, Roles and Legal Compliance	<ul style="list-style-type: none"> <li>Lack of clarity on WHS duties and due diligence obligations under WHS Act 2011 for PCBUs, officers and workers</li> <li>Absence of a documented WHS management plan specific to medical gas pipeline installation and testing</li> <li>Inadequate consultation, cooperation and coordination between PCBUs (builder, head contractor, specialist gas contractor, facility operator, commissioning agents)</li> <li>Failure to integrate Australian Standards (e.g. AS 2896, AS 3811, AS/NZS 3000) and state-based health-design guidelines into project governance</li> <li>Poor change management when scope, design, or schedule changes impact safety-critical systems</li> <li>Inadequate incident reporting, investigation and corrective action processes for design / system failures rather than just personnel injuries</li> </ul>	4A	<ul style="list-style-type: none"> <li>Develop and implement a project-specific WHS Management Plan that references WHS Act 2011, WHS Regulation and relevant Australian Standards for medical gas systems</li> <li>Define and document WHS roles, responsibilities and authorities for officers, project managers, supervisors, designers, commissioning engineers and subcontractors</li> <li>Establish a PCBUs consultation and coordination framework (regular WHS coordination meetings, documented interfaces and responsibilities, shared risk register)</li> <li>Embed legal and standards compliance checks into design reviews, procurement gates and commissioning stages (including clinical stakeholder review where required)</li> <li>Implement a formal management of change (MoC) procedure for design alterations, schedule compression and late change variations impacting medical gas safety</li> <li>Establish a structured incident and near-miss reporting, investigation and lessons-learned process focused on system and management failures, and communicate outcomes to all parties</li> </ul>	3H
2. Design, Engineering Controls and Technical Standards	<ul style="list-style-type: none"> <li>Deficient or non-compliant design of medical gas pipeline layout, isolation valves and control systems</li> <li>Incorrect gas identification, line labelling or colour coding leading to cross-connection or gas substitution errors</li> <li>Insufficient redundancy, isolation and emergency shut-off capability for critical care areas</li> <li>Inadequate provision for testing points, pressure relief and purge points in the design</li> <li>Failure to consider future expansion, modifications and maintenance access in the design, increasing future risk</li> <li>Poor coordination between mechanical, electrical, fire and structural</li> </ul>	4A	<ul style="list-style-type: none"> <li>Mandate that medical gas system design is undertaken and signed off by suitably qualified engineers experienced in healthcare gas systems and familiar with AS 2896 and related standards</li> <li>Implement a formal design verification and independent design review process including hazard identification (HAZID) / risk workshop for medical gas system design</li> <li>Standardise design templates, schematics, and legends for medical gas services with clear zoning, isolation strategy and alarm philosophy</li> <li>Require documented design coordination using BIM or equivalent clash detection processes to manage interfaces with other building services</li> <li>Include design provisions for testing points, purge arrangements, pressure relief valves, and access for inspection and maintenance in accordance with relevant standards</li> <li>Implement a formal design change control system to assess safety impact of all revisions and maintain a single controlled revision of design documents</li> </ul>	2M

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	designs causing clashes or compromised clearances			
3. Procurement, Supplier Management and Material Traceability	<ul style="list-style-type: none"> <li>• Procurement of non-compliant or counterfeit medical gas components, valves, outlets and pipework</li> <li>• Inadequate specification of technical and regulatory requirements in purchase orders and contracts</li> <li>• Lack of traceability for critical materials (e.g. copper tube, fittings, manifolds, regulators, alarms)</li> <li>• Use of unauthorised substitutions due to supply shortages or cost pressures without technical review</li> <li>• Poor quality assurance of off-site prefabrication or modular assemblies for gas systems</li> <li>• Inadequate storage and handling controls leading to contamination, damage or mix-up of components</li> </ul>	4A	<ul style="list-style-type: none"> <li>• Develop a project procurement plan for medical gas systems that specifies applicable standards, certification requirements and approved manufacturers/suppliers</li> <li>• Pre-qualify suppliers and manufacturers based on demonstrated compliance with medical gas standards, quality systems and relevant certification</li> <li>• Implement a documented material traceability system (batch numbers, heat numbers, certificates of conformity) for safety-critical components and pipework</li> <li>• Prohibit product substitutions without technical engineering assessment, risk review and formal approval process</li> <li>• Conduct vendor audits or quality inspections for off-site fabrication and modular assemblies before delivery to site</li> <li>• Establish controlled storage, segregation and handling procedures for medical gas components, including contamination control (dust caps, protective packaging, cleanliness requirements)</li> </ul>	2M
4. Contractor Selection, Competency and Training Systems	<ul style="list-style-type: none"> <li>• Engagement of contractors without specific competency in medical gas pipeline installation and testing</li> <li>• Insufficient verification of licences, trade qualifications and non-specific training (e.g. brazing, purging, leak testing, alarm systems)</li> <li>• Inadequate induction and ongoing training about medical gas system criticality, hospital environment and clinical risk context</li> <li>• Lack of supervision or mentoring for new or inexperienced workers on medical gas works</li> <li>• No systematic competency assessment for commissioning technicians and verifiers</li> <li>• Poor understanding of infection prevention, contamination control and hospital-specific policies by trades personnel</li> </ul>	4A	<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. Project Planning, Sequencing and Interface Management	<ul style="list-style-type: none"> <li>Poor project scheduling causing installation and testing to overlap with clinical operations without adequate controls</li> <li>Unsafe sequencing with other trades leading to pipe damage, contamination or unplanned system outages</li> <li>Inadequate planning for isolation, connection and changeover from existing systems to new systems</li> <li>Compressed timeframes causing shortcuts in testing, documentation or verification processes</li> <li>Failure to plan for out-of-hours work when interfacing with live hospital systems</li> <li>Insufficient integration of WHS and clinical risk considerations into the master program</li> </ul>	4A	<p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p> <p>[REDACTED]</p>	2M
6. Design and Drawing Control, Labelling and Documentation Management	<ul style="list-style-type: none"> <li>Use of superseded or incorrect drawings and schematics during installation or testing</li> <li>Inconsistent or missing pipe labelling, colour coding and signage leading to misidentification of phases</li> <li>Failure to update as-built drawings and line diagrams after design changes and site variations</li> <li>Uncontrolled distribution of technical documents resulting in multiple conflicting versions on site</li> <li>Inadequate documentation of isolation points, valve numbering and alarm zones</li> <li>Poor record-keeping of test results, certifications and commissioning data</li> </ul>	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>	1L
7. Isolation, Permit-to-Work and Interaction with Live Systems	<ul style="list-style-type: none"> <li>Unplanned interruption of medical gas supply to occupied clinical areas during tie-ins or testing</li> <li>Incorrect valve operation or misidentification of isolation points</li> </ul>	4A	<p>[REDACTED]</p> <p>[REDACTED]</p>	2M

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	<ul style="list-style-type: none"> <li>Inadequate communication with clinical staff before and during planned outages</li> <li>Bypassing or defeating alarm systems during testing without appropriate monitoring and contingency</li> <li>Lack of a robust permit system for hot works, confined spaces and work on live systems</li> <li>Failure to verify zero energy/pressure state prior to intrusive work on existing lines</li> </ul>		[REDACTED]	
8. Contamination Control, Cleanliness and Infection Prevention Systems	<ul style="list-style-type: none"> <li>Introduction of particulate, oil, moisture or microbial contamination into medical gas pipelines</li> <li>Inadequate cleaning, purging and validation of lines before connection to manifold or terminal units</li> <li>Non-compliance with hospital infection prevention requirements during construction works</li> <li>Poor control of dust, debris and fume from associated construction activities near open pipelines</li> <li>Use of non-approved cleaning agents, lubricants or sealants that contaminate gas supply</li> <li>Inadequate segregation between construction areas and clinical spaces</li> </ul>		[REDACTED]	2M
9. Testing, Verification and Commissioning Management	<ul style="list-style-type: none"> <li>Incomplete or inadequate pressure testing, leak testing and functional testing of medical gas systems</li> <li>Testing performed with incorrect gases or pressures, creating hazards or damaging equipment</li> <li>Lack of independence or competency in verification and sign-off processes</li> <li>Failure to simulate fault conditions and alarm responses prior to handover</li> </ul>	4A	[REDACTED]	2M

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	<ul style="list-style-type: none"> <li>Poor management of temporary test gases, equipment and connections on site</li> <li>Inadequate documentation and traceability of testing, leading to gaps or unverified sections</li> </ul>		[REDACTED]	
10. Integration with Building Services, Fire Safety and Emergency Systems	<ul style="list-style-type: none"> <li>Medical gas systems installed in conflict with fire compartments, egress paths or smoke control systems</li> <li>Lack of integration between gas shutdown procedures and fire / emergency response plans</li> <li>Inadequate fire stopping around pipe penetrations compromising compartmentation</li> <li>Poorly coordinated routing with electrical systems increasing risk of ignition or electromagnetic interference with alarm systems</li> <li>Insufficient access for emergency isolation in a fire or other critical incident</li> <li>Failure to inform emergency responders of medical gas system layout, isolation points and hazards</li> </ul>	3H	[REDACTED]	1L
11. Worker Health, Fatigue and Psychological Safety Management	<ul style="list-style-type: none"> <li>Extended hours, night work or compressed programs contributing to fatigue-related errors in critical tasks</li> <li>Stress and performance issues associated with working on life-critical systems and active clinical facilities</li> <li>Inadequate systems to manage worker health conditions that could impair safe performance (e.g. respiratory issues, use of medication)</li> <li>Poor reporting culture for near misses, mistakes or quality concerns due to fear of blame or contractual pressure</li> <li>Insufficient support and debriefing following significant incidents or clinical near misses linked to construction works</li> </ul>	3H	[REDACTED]	2M

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12. Site Access, Security and Public / Patient Interface	<ul style="list-style-type: none"> <li>• Unauthorised access of workers to sensitive clinical areas or plant rooms containing live gas infrastructure</li> <li>• Patients, visitors or hospital staff entering construction zones and encountering unprotected hazards</li> <li>• Inadequate security of gas cylinders, manifolds or temporary supplies during installation and testing</li> <li>• Poor wayfinding and signage causing confusion during emergency evacuations or code events while works are in progress</li> <li>• Vehicle and plant movements in shared hospital access ways creating collision risk with pedestrians and emergency vehicles</li> </ul>	3H	[REDACTED]	1L
13. Emergency Preparedness, Incident Response and Business Continuity	<ul style="list-style-type: none"> <li>• Lack of clear emergency response procedures for gas leaks, cross-connection, contamination or system failure during works</li> <li>• Inadequate drills or training for construction and facility staff on medical gas related emergencies</li> <li>• Unclear communication protocols between contractor, hospital engineering, clinical teams and emergency services during an incident</li> <li>• Failure to plan for business continuity and clinical service impacts if medical gas systems are compromised</li> <li>• Delayed or ineffective incident escalation leading to increased harm or prolonged outages</li> </ul>	4A	[REDACTED]	2M
14. Handover, Documentation, Training and Lifecycle Management	<ul style="list-style-type: none"> <li>• Incomplete or inaccurate handover documentation to the health facility (as-builts, manuals, certificates, test results)</li> <li>• Insufficient training for facility engineering and clinical staff on new or modified medical gas systems</li> </ul>	3H	[REDACTED]	1L

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	<ul style="list-style-type: none"> <li>• Failure to establish routine inspection, maintenance and re-verification schedules for the installed system</li> <li>• Loss of critical records impacting future modifications, troubleshooting or incident investigations</li> <li>• Lack of clarity over ongoing ownership, responsibility and change control after project completion</li> </ul>		<div style="background-color: black; height: 15px; width: 100%;"></div>	

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-of-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.