Heat Treatment Ovens and Injection Moulding

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:

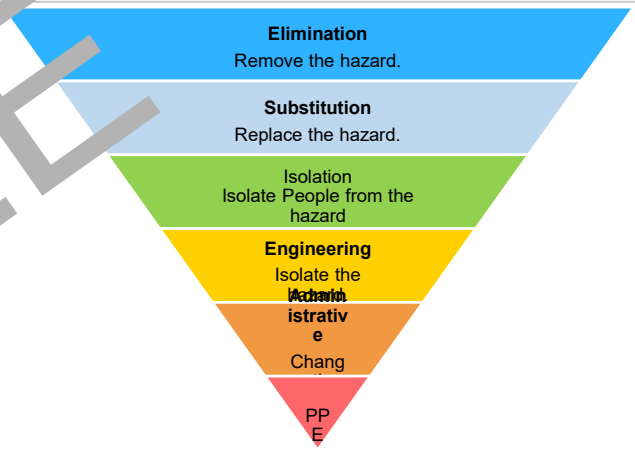
CLIENT OR PRINCIPAL CONTRACTOR DETAILS

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, Consultation and Due Diligence	• Lack of documented WHS policy and objectives specific to heat treatment ovens and injection moulding operations • Board and senior management not demonstrating due diligence as required by WHS Act 2011 (e.g. limited understanding of process safety risks, no regular WHS performance review) • Inadequate consultation mechanisms with workers and Health and Safety Representatives (HSRs) on thermal and machinery risks • No clear assignment of WHS roles, responsibilities and accountabilities for high-risk plant and processes • Failure to allocate sufficient resources (people, time, budget) to manage major hazard potential of ovens, kilns, presses and moulding machines • Inadequate integration of WHS duties into procurement, engineering, production and maintenance decision-making	4A	• Establish and maintain a WHS governance framework that explicitly covers heat treatment ovens, injection moulding, die-casting and press operations, aligned with WHS Act 2011 officer due diligence obligations • Define and document WHS responsibilities, authority and accountabilities for officers, managers, supervisors, engineers and contractors in relation to plant safety and process safety • Implement regular WHS performance reporting to the board and executive, including lead and lag indicators for thermal exposure, machinery guarding, interlock failures, near misses and notifiable incidents • Formally consult with workers and HSRs on the design, selection, modification and decommissioning of ovens, kilns, presses, conveyor systems and injection moulders • Include WHS risk management for heat treatment and injection moulding as a standing agenda item in management review meetings • Ensure officers receive periodic training on process safety, major incident prevention and their specific duties under WHS Act 2011 and WHS Regulations • Integrate WHS risk assessment outcomes into strategic planning, capital expenditure proposals and production planning decisions	3H
2. Plant Procurement, Design and Installation	• Selection of ovens, kilns, presses and injection moulders that are not designed to relevant Australian Standards or are unsuitable for the specific materials and temperatures used • Inadequate specification of guarding, interlocks, emergency stops and safety control systems at the procurement stage • Imported plant without proper verification of design, conformity assessment or documentation (manuals, schematics, CE/AS/NZS compliance evidence) • Poorly designed access, platforming and egress around conveyor ovens, truss presses and kilns leading to falls and crush zones	4A	• Implement a formal plant procurement and approval process requiring WHS, engineering and end-user review of specifications for heat treatment ovens, injection moulders, die-casting machines, presses and kilns • Specify compliance with relevant Australian Standards (e.g. AS/NZS 4024 series for machine safety) and require suppliers to provide verification of conformity, design risk assessments and detailed technical documentation • Mandate engineered guarding, hard-wired interlocks, dual-channel safety circuits and fail-safe emergency stop systems for all high-risk plant before purchase is approved • Ensure plant layout and foundation design includes safe clearances, access platforms, guard rails, safe access to maintenance points and segregation from pedestrian routes • Use management of change (MOC) and pre-installation risk assessments for new or relocated equipment, involving WHS, engineering, maintenance and operators • Treat installation and commissioning as controlled projects with SWMS, permits, isolation plans and verification testing of all safety systems prior to handover • Maintain a plant register that records design features, risk controls and verification results for each oven, kiln, press, conveyor system and moulding machine	2M

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	• Inadequate segregation of hot surfaces, moving parts and pinch points from walkways and other work areas • Installation work not managed as a high-risk construction activity, leading to uncontrolled commissioning hazards			
3. Process Safety and Thermal Energy Management	• Uncontrolled heat build-up in conveyor ovens, kilns, heat treatment lines and float glass furnaces leading to fire or explosion • Inadequate control of process temperatures, dwell times and cooling cycles for heat treatment of sports gear, truss pressing and board pressing • Failure of temperature control systems, safety thermostats or over-temperature cut-outs • Inadequate combustion control or ventilation resulting in accumulation of flammable gases or decomposition products • Lack of clearly defined safe operating envelopes (SOEs) for in… moulding, kiln drying… and pressure treatment process… • Process upsets n… …ce… …d or responded to promptly due to inadequate monitoring or alarms	4A	• Develop and doc… …cess …fety standards for all heat treatment, drying, pressing and moulding operations, def…g safe o…rating …velopes a… critical limits for temperature, pressure and time • Install and m…tain inde…dent ove… …perature protection devices, high-temperature alarms and autom…c shut…n sys…ms on ovens, …lns and heat treatment plant • Imple…t contin…s temperature and pressure monitoring with data logging and alarm management, includi… d…ned ala… response procedures • Desig… venti…on and …xhaust systems to control buildup of heat, fumes and flammable vapours, …ported by pe…dic performance testing • Esta…sh clear procedures for start-up, normal operation, upset management and shutdown of ovens, …nveyo… …stems, presses and kilns, with specific criteria for safe restart after trips • …nduct process hazard analyses (e.g. HAZOP or structured risk workshops) for complex systems such as float glass production and pressure treatment processes • Train supervisors and key operators in recognising early warning signs of process deviation and in executing escalation and shutdown protocols	2M
4. Plant Guarding, Interlocks and Machine Safety Systems	• Inadequate fixed guardi… …nd moving parts of injection moulders, die-casting machines, quick-set truss presses and conveyor drives • Safety interlocks on guards or access doors bypassed, defeated or poorly maintained • Failure of light curtains, pressure-sensitive mats or two-hand controls due to lack of testing or incorrect integration • Exposure to nip, crush and shear points at demoulding stations, board	4A	[redacted]	2M

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	pressing operations and flat belt conveyors • Uncontrolled movement of overhead chain conveyors or mould closing mechanisms during cleaning or unjamming • Safety system design changes (e.g. automation upgrades) made without risk assessment or validation		[redacted]	
5. Energy Isolation, Lockout and Maintenance Management	• Maintenance or cleaning performed on live plant without adequate isolation of electrical, pneumatic, hydraulic or thermal energy • Inconsistent or informal lockout/tagout practices across ovens, presses, kilns and moulders • Stored energy release from press platens, injection clamps, pressure treatment vessels or overhead conveyors during maintenance • Failure to isolate and dissipate residu heat in kilns, board presses and conveyor ovens before repair • Poor coordination contractors performing mainte nce on com lex systems leading to exp d sta p • Inadequate planning and documentation of preventative maintenance, resulting in ical or safety system failures	4A	[redacted]	2M
6. Thermal Exposure and Occupational Hygiene Management	• Chronic exposure to high radiant heat from kilns, float glass production lines, conveyor ovens and board presses • Acute heat stress or heat stroke during peak temperature periods or when working near hot surfaces for extended durations • Inadequate management of humidity and ambient temperature in areas housing multiple ovens and heat presses	4A	[redacted]	2M

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	• Insufficient break schedules, hydration provisions or acclimatisation for workers in hot environments • Lack of health monitoring for workers at increased risk from heat (e.g. medical conditions, certain medications) • Failure to recognise early signs of heat-related illness		[redacted]	
7. Hazardous Substances, Fumes and Air Quality Control	• Generation of fumes, vapours and decomposition products from plastics, coatings, adhesives and resins during injection moulding, die-casting, heat sealing and heat treatment of sports gear • Release of formaldehyde, VOCs or other hazardous chemicals from board pressing, kiln drying and quick-set truss press processes • Inadequate local exhaust ventilation or general ventilation leading to accumulation of airborne contaminants • Inaccurate or absent safety data sheets (SDS) and chemi[redacted]isters for products used in ov[redacted], kilns and moulding processe[redacted] • Lack of atmosphe[redacted]g to verify control effectiven[redacted]ss and compliance with workplace exposur[redacted] standards • Poor maintenance of extraction systems, filters and ducting	3H	[redacted]	2M
8. Materials Handling, Conveyors and Demoulding Systems	• Uncontrolled movement of product on overhead chain conveyors or flat belt systems causing entanglement or impact with workers • Manual handling of hot, heavy or awkward moulds, glass, boards and sports gear leading to musculoskeletal disorders and contact burns • Jamming of product in conveyor ovens and demoulding stations leading to unsafe interventions by workers	4A	[redacted]	2M

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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
	• Poorly designed chutes, hoppers or loading arrangements causing spillage and unplanned access to hazardous zones • Inadequate guarding and emergency stop coverage along conveyor routes through ovens and presses • Lack of systems to manage fallen or misrouted product in elevated or enclosed conveyor areas		[redacted]	
9. Control Systems, Automation and Software Management	• Uncontrolled or unexpected plant behaviour due to control system faults, software errors or programming changes • Lack of version control and change management for PLC, HMI and safety logic affecting ovens, presses and injection moulders • Inadequate segregation between safety-related controls and basic process control systems • Operators and maintenance personne[redacted] not trained in the functio[redacted]itations o[redacted] automated safety fea[redacted]es • Cybersecurity vu[redacted]erabilities in networked control [redacted]stems[redacted] unauthorised or unin[redacted]ed changes • Control system alarms poorly configured, resulting in al[redacted]m fl[redacted]ing and alarm fatigue		[redacted]	2M
10. Competency, Training and Supervision	• Operators, setters and maintenance staff lacking formal competency in heat treatment, injection moulding and kiln operation • Inadequate understanding of the specific hazards associated with float glass production, pressure treatment and quick-set truss pressing • No structured induction covering plant-specific risks, emergency response and safety systems	3H	[redacted]	2M

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	• Supervisors not adequately trained to recognise unsafe behaviours, non-compliance with procedures or early signs of plant failure • Informal on-the-job training leading to inconsistent practices across shifts and crews • Failure to refresh training after incidents, process changes or equipment upgrades		[redacted]	
11. Safe Systems of Work, Permits and Documentation	• Critical tasks (e.g. entry into kilns, work on pressure vessels, hot work near flammable materials) conducted without formal permits • Procedures and work instructions outdated, inconsistent or not readily accessible at point of use • Reliance on informal practices for non-routine operations such as clearing blockages in conveyor ovens or rethreading overhead chains • Inadequate integration of risk assessment findings into operating procedures and work instructions • Lack of coordination between different work groups or contractors working on the same plant or areas • Poor document control leading to multiple versions of procedures in circulation	H	[redacted]	2M
12. Emergency Preparedness, Fire and Explosion Management	• Fire in conveyor ovens, kilns, board presses or float glass furnaces due to product ignition or equipment failure • Explosion or rapid overpressure in pressure treatment processes or enclosed ovens • Inadequate fire detection, suppression and emergency isolation systems for high-temperature plant and fuel supplies	4A	[redacted]	2M

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	• Workers unaware of emergency procedures for plant trips, gas leaks, chemical spills or loss of power • Insufficient coordination with Fire and Rescue services regarding site-specific hazards and access to ovens and kilns • Blocked or poorly marked emergency exits and egress routes from high-risk areas		[redacted]	
13. Contractor and Visitor Management	• Contractors performing installation, maintenance or modification works on ovens, presses and conveyors without adequate understanding of site hazards and procedures • Inadequate supervision and coordination of multiple contractors working near operating plant • Visitors entering production areas without appropriate briefings or controls • Reliance on contractor WHS systems without verifying their adequacy in the context of high-risk plant • Uncontrolled introduction of tools, equipment or materials that are incompatible with safe work requirements • Insufficient induction of short-term / ad-hoc contractors engaged for specialised work on kilns, presses, moulders or control systems	3H	[redacted]	2M
14. Monitoring, Auditing, Reporting and Continuous Improvement	• Failure to detect deteriorating plant conditions, emerging risks or declining WHS performance • Under-reporting of incidents, near misses and safety concerns related to ovens, kilns, presses and injection moulders • Lack of structured inspections and audits of high-risk plant and safety systems	3H	[redacted]	1L

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	• Data from inspections, monitoring and incidents not analysed to identify trends or systemic issues • Actions from investigations and audits not implemented or verified for effectiveness • Complacency following periods without major incidents leading to erosion of controls		[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