

HIRAC Report

Risk, Health and Safety

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91. Hazard Management Details – General

This form relates to OHS Procedure – [Hazard Identification, Risk Assessment and Control \(HIRAC\)](#)

Plant/Equipment Item: Autoclave	Make/Model No.: All-American 24L, Steam, Electric Model: 50X	Serial No.:
School / Work Location: Ballarat Tech School (Fed College)	Region:	
Name of Person(s) Conducting Activity: Liam Mudge, Apollinaire Irumva		Date Conducted: 23/08/2021

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	<p>Description of Use:</p> <p>The Ballarat Tech School delivers a range of science curriculum projects. Some of these may be hazardous to user's health if safety procedures and lab etiquette are not followed.</p> <p>An autoclave is a piece of equipment used for the cleaning/sterilisation of laboratory equipment, by treating objects in a high pressure/temperature, environment.</p>	<p>Summary of Key Risks: (refer to appropriate subsections)</p> <ul style="list-style-type: none"> ▪ Burn (High temperature) ▪ High pressure ▪ Entanglement ▪ Impact and cutting ▪ Electricity ▪ Slips/trips/falls ▪ Temperature ▪ Other (dust)
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2. Documentation

Relevant Legislation/Standards	Y / N	Comments
Is plant required to be registered?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	N
Is a user license required?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>	N

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Key reference material:	<ul style="list-style-type: none"> • Risk Assessment: Autoclaving Faculty of Science/School of Molecular Bioscience. University of Sydney • Health & Safety Autoclave Hazards. University of Melbourne. • AS/NZS 3760 In service safety inspection and testing of electrical equipment 	
Plant Documentation	Y / N	Comments
Are operator's manuals accessible?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	
Is this a restricted use item?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	
Does this item require safe use documents/test?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Y

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3. Hazard Identification

Hazards Inspected	Risk Assessment		Description of Risk	Control Measures
	Initial	Residual		
<p>ENTANGLEMENT Can anyone's hair, clothing, gloves, cleaning brushes, tools, rags or other materials become entangled with moving parts of the plant or materials?</p> <p style="text-align: center;">Y <input checked="" type="checkbox"/> N <input type="checkbox"/></p>	Medium	Low	<ul style="list-style-type: none"> Long hair, loose clothing, rags, cleaning brushes and jewellery could become entangled in the moving parts of the equipment or, could knock over equipment/vessels 	<ul style="list-style-type: none"> Ensure hair, loose clothing, rags and jewellery is kept clear of moving parts when in use. Aprons can be used to restrict loose clothing. Hair ties/hair nets can be used to secure long hair. Ensure inappropriate jewellery and accessories (e.g. bracelets) are not worn when operating equipment.

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IMPACT AND CUTTING INJURIES				
Can anyone be crushed/cut/struck etc. due to				
• Material falling off the plant?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• Uncontrolled/unexpected movement of plant/load?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	
• Lack of capacity to slow, stop or immobilise plant?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• The plant tipping or rolling over?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• Parts of the plant disintegrating or collapsing?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• Contact with moving parts during testing, inspection, operation, maintenance, cleaning or repair?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• Being thrown off or under the plant?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
• Contact with sharp or flying objects? (e.g. work pieces being ejected)	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	
• The mobility of the plant?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	
• Inappropriate parts and accessories being used?	Y <input checked="" type="checkbox"/> N <input checked="" type="checkbox"/>	Medium	Low	
• Other	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			

- During the Autoclaving process some objects may become dislodged/break and move freely in the vessel
- Removal of broken glassware from the Autoclave after cleaning may result in cuts.
- Lifting a loaded Autoclave may induce damage to objects inside and pose increase likelihood of damage and risk to operator.
- Materials not suited for Autoclaving may result in damage to components or other objects.
- Possible ejection of hazardous objects both material and biological in nature.

- Training, induction and following standard operating procedures. Consult manufacturer's manual as required.
- Use of appropriate PPE and tools to remove glass shards.
- Check objects are free from chips or cracks which may lead to further damage prior to Autoclaving.
- While the Autoclave is a portable system, it should be set up and where possible not moved.
- Never move a loaded, hot or pressurised Autoclave.
- Ensure only items appropriate for Autoclaving are loaded.
- Ensure that appropriate cleaning cycles are performed to destroy biological agents.

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Hazards Inspected		Risk Assessment		Description of Risk	Control Measures
		Initial	Residual		
SHEARING Can anyone's body parts be sheared between two parts of plant, or between a part of the plant and a work piece or structure?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
PRESSURISED CONTENT Can anyone come into contact with fluids or gases under high pressure, due to plant failure or misuse of the plant?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	High	Low	<ul style="list-style-type: none"> Autoclaves are a pressure vessel if the Autoclave is damaged or improperly packed it may result in the release of high temperature steam. 	<ul style="list-style-type: none"> Ensure Autoclave is properly loaded and operated according to the Standard Operating Procedure. Ensure regular preventative maintenance and cleaning of Autoclave. Inspect equipment for damage/faults prior to operation.
ELECTRICITY Can anyone be injured or burnt due to:				<ul style="list-style-type: none"> Damaged or frayed electrical cables pose an electrical hazard. Water and steam may cause electrical hazard 	<ul style="list-style-type: none"> Operator to check for damaged electrical cords prior to use. Ensure equipment is regularly serviced, tested and tagged (if not hardwired) and
1. Live electrical conductors? (e.g. exposed wires)	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>				
2. Working in close proximity to electrical conductors?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				

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Hazards Inspected		Risk Assessment		Description of Risk	Control Measures
3. Access to electricity?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>				
4. Damaged or poorly maintained electrical leads, cables or switches?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	High	Low		
5. Water near electrical equipment?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		
6. Lack of isolation procedures?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
7. Other	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				

Hazards Inspected		Risk Assessment		Description of Risk	Control Measures
		Initial	Residual		
ERGONOMICS				8. Use of force may be required to open interlocked doors. 9. Awkward posture while loading/unloading. 10. Inappropriate placement of machinery controls.	14. Ensure pressure is fully normalised to allow correct operation. 15. Ensure operator has clear access to load/unload.
Can anyone be injured due to:					
<ul style="list-style-type: none"> Poorly designed workstation? 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
<ul style="list-style-type: none"> Repetitive body movement? 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				

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• Constrained body posture or the need for excessive effort?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	11. Design of workstation does not allow observation of machine and control system at the same time. 12. Inadequate lighting may result in incorrect wiring/assembly. 13. Ineffective loading practices posing risk of spilling chemical or sharp objects.	16. Ensure adequate room to perform task unobstructed. 17. Ensure adequate lighting to perform task. Additional lighting may be required if ambient/room lighting is insufficient 18. Risk of back injury or strain due to lifting (repetitive) when loading or unloading the autoclave 19. Ensure operator uses appropriate manual handling techniques. 20. Electrical cables should be placed to avoid creating a tripping hazard in walkways.
• Design deficiency causing psychological stress?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
• Inadequate or poorly placed lighting?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
• Does the plant impact on the surrounding workplace and create potential hazards? (Consider safe access and egress from plant, workflow and design of the workplace)	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
• Is the location of the plant inappropriate? (Consider potential effects due to environmental conditions and terrain)	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
• Other	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				

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RADIATION Can anyone using the plant, or in the vicinity of the Plant suffer injury or illness due to exposure to radiation in the form of any of the following: 21. infra-red radiation 22. ultraviolet light 23. microwaves	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
NOISE Can anyone using the plant, or in the vicinity of the plant, suffer injury due to exposure to noise?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
VIBRATION Can anyone be injured or suffer ill-health from exposure to vibration?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
FRICION Can anyone be burnt due to contact with moving parts, materials or surfaces of the plant?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			
SUFFOCATION Can anyone be suffocated due to lack of oxygen, or atmospheric contamination?	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>			

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Hazards Inspected	Risk Assessment		Description of Risk	Control Measures
CONDITION Is a hazard likely due to the age and condition of the plant? (<i>Consider how hard the machine has been worked, and whether it is used constantly or rarely</i>).	Y <input type="checkbox"/>	N <input checked="" type="checkbox"/>		
• Can anyone be injured as a result of the plant not serviced appropriately and/or maintained in line with manufacturer's recommendations?	Y <input type="checkbox"/>	N <input checked="" type="checkbox"/>		

Hazards Inspected	Risk Assessment		Description of Risk	Control Measures
	Initial	Residual		
SLIPS/TRIPS/FALLS Can anyone using the plant, or in the vicinity of the plant, slip, trip or fall due to:			<ul style="list-style-type: none"> Poor housekeeping practices allowing the build-up of waste materials or failure to immediately clean up spills could result in a slip hazard. Inappropriate placement of objects (e.g. spare materials, bags etc) in the immediate vicinity of the plant equipment may result in trip hazard. 	<ul style="list-style-type: none"> Ensure appropriate cleaning and housekeeping practices are maintained to minimise the risk of a slip, trip or fall.
• Uneven, slippery or steep work surfaces?	Y <input type="checkbox"/>	N <input checked="" type="checkbox"/>		
• Poor housekeeping, e.g. spillage in the vicinity?	Y <input checked="" type="checkbox"/>	N <input type="checkbox"/>		
• Obstacles being placed in the vicinity of the plant?	Y <input checked="" type="checkbox"/>	N <input type="checkbox"/>	Low	Medium

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Hazards Inspected		Risk Assessment		Description of Risk	Control Measures
<ul style="list-style-type: none"> Inappropriate or poorly maintained floor or walking surfaces (i.e. lack of a slip-resistant surface, unprotected holes, penetrations or gaps?) 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
If operating or maintaining plant at height can anyone slip, trip or fall due to:					
<ul style="list-style-type: none"> Use of work platforms, stairs or ladders? 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
<ul style="list-style-type: none"> Lack of guardrails or other suitable edge protection? 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				
<ul style="list-style-type: none"> Other 	Y <input type="checkbox"/> N <input checked="" type="checkbox"/>				

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Hazards Inspected		Risk Assessment		Description of Risk	Control Measures
		Initial	Residual		
FIRE AND EXPLOSION Can anyone be injured by fire?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	<ul style="list-style-type: none"> Autoclaves are a pressure vessel if the Autoclave is damaged or improperly packed it may result in the release of high temperature steam. Failure of pressure vessel relief valve or other components. Steam may escape from seals. Opening Autoclave while still pressurised may cause sudden release of steam. 	<ul style="list-style-type: none"> Ensure Autoclave is properly loaded and operated according to the Standard Operating procedure. Appropriate use of PPE. Only ever operated by training and authorised persons. Ensure regular preventative maintenance and cleaning of Autoclave. Do not move or open the Autoclave while it is pressurised, hot or loaded.
<ul style="list-style-type: none"> Can anyone be injured by explosion of gases, vapours, liquids, dusts, or other substances? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		
TEMPERATURE/MOISTURE Can anyone come into contact with objects at high or low temperatures?	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	High	Low	<ul style="list-style-type: none"> Autoclave operates at high temperature with objects remaining hot for a time after the process. 	<ul style="list-style-type: none"> Appropriate use of PPE. Ensure Autoclave is properly loaded and operated according to the Standard Operating procedure.
<ul style="list-style-type: none"> Can anyone suffer ill-health due to exposure to high or low temperatures? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		

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<ul style="list-style-type: none"> Can anyone be injured or suffer ill-health due to exposure to moisture? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low	<ul style="list-style-type: none"> Opening Autoclave while still pressurised may cause sudden release of steam. 	<ul style="list-style-type: none"> Only ever operated by training and authorised persons. Ensure regular preventative maintenance and cleaning of Autoclave. Do not move or open the Autoclave while it is pressurised, hot or loaded
OTHER					
Can anyone be injured or suffer ill-health from exposure to:				<ul style="list-style-type: none"> Dust and vapours generated from the work process may be hazardous to health. Possible for chemical spills to occur during normal use. Possible exposure to hazardous objects. Including, contaminated sharps, corrosive or volatile substances and other chemical/biological agents. 	<ul style="list-style-type: none"> Appropriate use of PPE. Ensure Autoclave is properly loaded and operated according to the Standard Operating procedure. Only ever operated by training and authorised persons. Ensure regular preventative maintenance and cleaning of Autoclave. Do not move or open the Autoclave while it is pressurised, hot or loaded.
<ul style="list-style-type: none"> Chemicals? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		
<ul style="list-style-type: none"> Toxic gases or vapours? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		
<ul style="list-style-type: none"> Fumes/Dusts? 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Medium	Low		
<ul style="list-style-type: none"> Other? (please specify) 	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>				

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4. Risk Assessment Signoff

Authorised By:	Signature:	Date:

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