



Plant and Equipment Safety Procedures

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POLICY:

1.0 Background

This document summarises the safety procedures of the University of Western Australia to control the hazard posed by a *plant and equipment* to minimise the risk of injury or disease arising from such sources.

These procedures provide the minimum requirements for all plant and equipment activities undertaken by employees and contractors and shall be followed by managers, staff, visitors, students and contractors of the University.

2.0 Legal requirements

The University shall comply with all requirements of the Occupational Safety and Health Act 1984 (amended March 1999), the Occupational Safety and Health Regulations 1996, Part 4 - Division 3 (amended December 1999), relevant Australian Standards, Codes of Practice and Guidance Notes and all relevant laws pertinent to plant which include: identification, risk assessment and control of hazardous plant, provision of personal protective equipment (PPE), induction and training, standard operating procedures (SOP), emergency procedures, signage, reporting incidents and injuries and record keeping (registers, etc).

2.1 Definitions Further information see [Appendix 6](#)

Plant

Plant is “any machinery, equipment (including scaffolding), appliance, implement or tool and any component or fitting thereof or accessory thereto”.

Plant is machinery that processes material by way of a mechanical action which

- Cuts, drills, punches or grinds
- Presses forms, hammers, joins, or moulds material
- Combines, mixes, sort, packages, assembles, knits or weaves material.

Plant also includes lifts, cranes, tractors, earth moving equipment, pressure equipment, hoists, powered mobile plant, plant that lifts or moves people or materials, amusement structures, high powered lasers, turbines, explosive powered tools, scaffolds, chisels, saws, photocopiers, desks, filing cabinets and temporary access equipment

Hazard

Hazard means the potential to cause injury or illness Examples of potential harm that plant or associated systems of work may cause to people at work include

- Injury from entanglement
- Crushing by falling or moving objects, or plant tipping over
- Crushing from people being thrown off or under plant
- Cutting or piercing due to sharp or flying objects
- Friction burns
- Injury from high pressure fluids
- Injury from electricity
- Injury from explosion
- Slips trips and falls

Risk Assessment

Risk assessment is the process of determining whether there is a risk associated with each of the hazards identified, that is, whether there is any likelihood of injury or illness

Risk Control

Is the process of implementing measures to reduce the risk associated with a hazard. When controlling risk, the hierarchy of control should be considered in order of priority.

Hierarchy of Control

The Hierarchy of Control is the established priority order for the types of measures to be used to control risks.

1. Elimination of the hazard
2. Substitution eg of the equipment or substance
3. Engineering controls, controls, which use engineering measures to change the physical characteristic of plant to eliminate or reduce risk. Eg guarding
4. Administrative controls, controls, which use systems of work to eliminate or reduce, risk eg supervision, training, and rotation
5. Personal protective equipment, (PPE)

Systems of work

Describes a wide range of activities, which can contribute to safe work. These may include, policies and procedures, systems of communication, organisation of work, skills and experience, work practices, emergency procedures.

Standard Operating Procedure (SOP)

These are practices developed during the risk assessment to alert employees and operators of the hazards associated with the plant. Standard Operating Procedures **do not** take the place of training or operation manuals.

Plant exemptions

Plant which relies exclusively on manual power for its operation or which is designed to be primarily supported by hand **is not** covered by these procedures. General duties of care as required under the Occupational Health and Safety Act still applies.

Machine Guarding

Physical barriers that make machines safe by preventing access to dangerous parts.

Commissioning

In relation to plant, means performing the necessary adjustments, tests and inspections before the plant is used to ensure that the plant is in full working order in accordance with the requirements specified in the design of the plant, and includes recommissioning.

3.0 Responsibilities

3.1 University

Is overall responsible for the implementation of the UWA Plant and Equipment Safety Procedures.

3.2 Deans and Heads of School / Centre (in their area of control) are responsible for ensuring:

- All supervisory staff, contractors, students and visitors are aware of and act upon their responsibilities in accordance with these Plant and Equipment Safety Procedures, associated legislative requirements and standard operating procedures
- Arranging for the registration of plant to the appropriate authority and to maintain the Plant Register ([Appendix 1](#))
- All new purchases, plant acquisitions and modified and / or manufactured by UWA personnel (including contractors) and existing plant are assessed in accordance with the Regulations by the supplier, manufacturer and / or designer ([Appendix 2](#))
- Liaising with the Safety and Health Office for assistance with compliance of this document

3.3 Office of Facilities Management (in their area of control) are responsible for ensuring:

- Ensuring compliance of occupational health, safety and environmental issues in accordance with legislative requirements and this document when initiating a purchase, whether to purchase the item or requesting someone else to purchase. Refer to the [UWA Purchasing Safety Guidelines](#).
- Arranging for the registration of plant to the appropriate authority and to maintain the Plant Register ([Appendix 1](#))
- Ensuring all planners, designers, manufacturers, suppliers, contractors, installers, operations, maintenance personnel and staff who are engaged to work with plant and equipment comply with this document and associated legislative requirements
- Ensuring all new purchases and plant acquisitions are assessed in accordance with the Regulations by the supplier, manufacturer and / or designer ([Appendix 2](#))
- Liaising with the Safety and Health Office for assistance with compliance of this document

3.4 Supervisors (competent person) (in their area of control) are responsible for:

- Ensuring that all staff and contractors (and if applicable students) who have been trained / instructed in plant safety within their area are aware of their responsibilities to work and act safely in accordance with this document, SOPs / instructions and related documents
- Information, instruction and training is provided to all staff and students exposed to risks associated with plant
- Plant Register, applicable Licensing requirements, UWA Purchase and Plant Hazard Checklist and all related SOPs to be maintained for auditing purposes
- Any local policy and procedures must be cross-referenced to these and any other relevant procedures
- Liaising with the Safety and Health Office for assistance with compliance of these procedures

3.5 Staff

- Always complying with this document and associated legal requirements
- Undertake training as provided by the employer
- Observe all rules and precautions outlined in the standard operating procedures / instructions in a manner which does not adversely affect their own safety and health or that of others
- Immediately reporting all matters which may affect workplace health and safety in relation to plant and associated systems of work to their supervisor

3.6 Contractors are responsible for:

- Complying at all times with this document and associate legislative requirements
- If applicable, work under the authorised University of Western Australia confined space permit and Permit to Work Procedures
- Notifying the immediate supervisor / competent person of any situation they believe poses a threat to the safety and health of persons involved in confined spaces work

3.7 Students and Visitors

- Are responsible for always complying with this document

3.8 Safety and Health Office (in their area of control) are responsible for:

- Assist Deans and Heads of School / Centres / Office of Facilities Management and Supervisors to implement this document

PROCEDURES:

4.0 Administrative Arrangements

4.1 Consultation

Regulations place an obligation on UWA to consult with a safety and health representative of a designated work group. In particular, UWA purchasers of plant should use the regular contact with their suppliers to discuss relevant safety and health issues associated with plant prior to planning for the introduction of new or modified plant or systems of work to allow for possible changes.

Schools, Sections and purchasing personnel must consult (through discussions, section meetings, safety and health committee meetings, hazard, incidents or injury reports) with the relevant Safety and Health Representative where the hazard identification, risk assessment or control of risks processes affects the safety and health representatives work group.

4.2 Planning and Purchasing

Suppliers have a duty to provide information on hazards associated with use of plant and equipment. Elimination, substitution or engineering controls can be applied most effectively at the planning, design and purchasing stages. When UWA personnel and purchasers are intending to purchase plant

and equipment, risks associated with the use of the intended plant and processes must be considered and [Appendix 2](#) completed and actioned accordingly in accordance with this document and the **UWA Purchasing Safety Procedures**.

4.3 Risk Management

4.3.1 Risk Identification

Schools, Sections and Office of Facilities Management must ensure that all hazards associated with the installation, commissioning, erection, use of plant and systems of work (SOPs) associated with that plant are identified (including registration and licensing) [Appendix 1](#), [2](#) and [4](#):

Write a list of all plant, then prioritise the plant against certification and registration and then accordingly

- Before the plant is used for the first time
- Before any alterations to the plant or change in the way the plant is used or a system of work associated with the plant, including a change in the location of the plant
- Before the plant is used for any other purpose than for which it was designed
- If new or additional information about hazards relating to the plant or its associated systems of work becomes available to the employer
- For all plant in the workplace at the date of the Regulations as referenced in Section 6.0

When identification hazards of plant consideration to the following must be given:

- Injury from entanglement
- Crushing by falling or moving objects, or plant tipping over
- Crushing from people being thrown off or under plant
- Cutting or piercing due to sharp or flying objects
- Friction burns
- Injury from high-pressure fluids
- Injury from electricity
- Injury from explosion
- Slips trips and falls
- Suffocation
- Ergonomic requirements
- High temperatures
- Dust, vibration, noise, radiation

For more information on examples of potential hazards that may arise with using plant and equipment, see [Appendix 4](#)

4.3.2 Risk Assessment

Once hazards associated with plant have been identified, using the UWA Plant Hazard **Identification** Checklist ([Appendix 2](#)) and the UWA Safety Risk Management Procedures http://www.safety.uwa.edu.au/policies/safety_risk_management_procedures, the identified hazards are assessed to determine whether the risk is a high, medium or low priority.

Note: the risk assessment may be done on a representative sample of plant where the risk factors are substantially the same.

4.3.3 Risk Control

Under the Regulations the primary duty of Schools, Sections and supervisors in relation to risk control is to eliminate where practicable any risk associated with plant and associated systems of work. Controls must be implemented as far as practicable for all risks identified. The Regulations clearly establish a priority order for the types of measures to be used to control risks. This control measure is referred to as the hierarchy of control: eliminate, substitute, engineering, administrative (SOP) and Personal Protective

4.3.4 Standard Operating Procedures (SOPs)

Following **risk identification assessment and control**, a **Standard Operating Procedure** is to be developed, displayed on or near plant and followed to alert staff, students and contractors operators to the hazards associated to the plant. See [Appendix 3](#) as an example.

4.4 Identification, Erection and Commissioning Plant

Schools, Sections, Office of Facilities Management and supervisors and who are coordinating plant installed or erected must have completed [Appendix 2](#) and [3](#) to:

- provide sufficient clear working area around the plant
- ensure the layout of plant does not affect access and egress to and from the workplace.
- not be brought into operation unless the commissioning process is established
- include inspections, which will ensure that risks associated with these activities are monitored

4.5 Inspection and Maintenance: Plant in Use

Plant should be maintained, cleaned and inspected in accordance to the recommendations of the designer, manufacturer and supplier including all safety features and warning devices maintained and tested regularly. Where practicable the systems of work (SOP) should involve the stopping plant before maintenance, cleaning or repairs are commenced and the use of lockout or isolation devices ([Appendix 5](#)) and permit to work systems.

Where plant is currently in use, supervisors are required to carry out regular **inspections** to monitor risks to safety and health as referenced in http://www.safety.uwa.edu.au/policies/inspecting_the_workplace

4.6 Powered Plant

Powered mobile plant must be assessed to ensure that the likelihood of powered plant overturning or of a falling object coming into contact with the operator or the operator being ejected from the plant is eliminated in accordance with [Appendix 2](#).

Where pedestrians are to be in the vicinity of the mobile plant warning devices must be installed

No person must ride on the powered mobile plant unless the person is afforded a level of protection from exposure to risk, which is equivalent to that provided by the operator.

4.7 Electrical Plant

Plant must not be used if conditions give rise to a risk due to the presence of electricity. When maintenance or cleaning or repair of electrically powered plant is being carried out the plant must be disconnected from the electricity supply.

Excavations using plant near underground power lines must ensure that there is no risk to the operators. Plant operated near overhead electrical power lines must ensure that there is no risk to the operators.

All electrical plant and equipment must be test tagged prior to use. See UWA Electrical Safety Procedures for Movable Equipment <http://www.safety.uwa.edu.au/>

4.8 Plant used to Lift or Suspend Loads including People and Materials

Plant must be specifically designed to lift or suspend the load, loads must not be suspended or pass over a person, the load must be in control during the activity and as far as practicable no load should be lifted simultaneously by more than one piece of equipment.

Supervisors must ensure where plant is to be used to lift persons:

- The people are lifted or suspended in a work box, which is securely attached to the plant.
- The people remain in the work box while they are being lifted or suspended
- If there is likelihood of a person falling from a height a safety harness must be provided and worn by the person
- There must be means of egress from the plant in the event of a failure in the normal operation of the plant
- Follow the SOP and wear the appropriate PPE

4.9 Industrial Lift Trucks

Lift trucks must be equipped with the appropriate lifting attachments for the load and used in a manner that ensures the operator is not at risk. The operator of a fork lift truck must have a certificate to operate (LF).

4.10 Damaged Plant

Where the School, Section representative or supervisor is assessing the function and condition of plant that is impaired or damaged and presents an immediate risk to safety and health, the plant should be withdrawn from use until the risk is controlled. See [Appendix 5](#)

4.11 Alteration to Plant

Where modifications are made to the plant, or where the plant is to be altered, the School, Section or Office of Facilities Management should ensure that the design of the alteration has undergone a hazard identification and risk assessment ([Appendix 2](#)). When the plant is altered, the purchaser (at a minimum) should inspect and arrange testing having regard to the design specifications for the alteration. This should occur before the plant is returned to service ([Appendix 2](#)).

4.12 Dismantling Plant

Where plant is to be dismantled, or decommissioning or otherwise sold or disposed of the School, Section or Office of Facilities Management personnel should ensure that any relevant information provided by the designer and manufacturer is given to the person who is to dismantle or take control of the plant. Where plant is to be disposed of, contents, materials presenting a risk to health or safety the coordinator of the plant must ensure that applicable legislative instructions and compliance is followed.

4.13 Registration of Plant

Under the *Occupational Safety and Health Regulations 1996* certain items of plant cannot be used in the workplace unless registered with WorkSafe WA. These include:

- Boilers categorised as hazard A,B,C according to the criteria identified in AS4343
- Pressure vessels categorised as hazard level A,B or C in AS 4343 other than gas cylinders or pressure pipes which AS2030, or LPG fuel vessels which AS3509 applies
- Tower cranes
- Lifts
- Building maintenance units
- Amusement structures except class 1
- Concrete placing units (truck mounted with boom)
- Mobile cranes with safe working load greater than 10 tonnes
- Gas cylinders
- Boom type elevating work platforms
- Gantry cranes with a safe working load greater than 5 tonnes, or which are designed to handle dangerous goods
- Bridge cranes with a safe working load greater than 10 tonnes, or which are designed to handle dangerous goods
- Mast climbing work platforms
- Hoists, with a platform movement in excess of 2.4 metres, designed to lift people

- Vehicle hoists

The School, Section or the Office of Facilities Management personnel must ensure that where applicable the registration of plant and alteration of plant is not used until registered with WorkSafe WA by referencing the website:

<http://www.slp.wa.gov.au/statutes/regs.nsf/Current%20Legislation%20Version2?OpenView&Start=1&Count=600&Expand=1.5&RestrictToCategory=O#1.5> or contacting WorkSafe WA on 9327 8777.

Where the application for registration is approved, WorkSafe will issue a registration number for the plant item registered. The following must be maintained by the School, Section, the Office of Facilities Management personnel or supervisor for auditing purposes:

- a current registration number of the plant is legibly stamped
- a copy of evidence of registration provided by WorkSafe is displayed on or near the plant item and
- where applicable, the current design registration number is kept in the vicinity of the plant and is readily accessible. ([Appendix 1](#))

4.14 Licensing and Certificate of Competency

Anyone who operates or uses high-risk items of plant must have a certificate of competency. School, Section personnel or supervisors must ensure that their staff have the proper certificate of competency for the plant they operate or use as indicated below. Alternatively staff can work under the direct supervision of someone with the relevant certificate of competency or equivalent qualification, to gain the necessary training. For further information, see WorkSafe

<http://www1.safetyline.wa.gov.au/sub9.htm#19>

National certificates of competency cover:

- Scaffolding, dogging and rigging.
- Crane and hoist operation.
- Forklift operation
- Pressure equipment operation.

4.15 Plant Not in Use

When plant is not in use it must be left in a state that does not create a risk (so far as is practicable) for any person and appropriate tagout procedures in place ([Appendix 5](#)) or removed from premise.

4.16 Information, Instruction and Training

The University is required under the Occupational Health and Safety Act to provide information, instruction and training to employees to ensure that the work can be performed in a manner that is safe and without risks to health. If a hazard related to the plant and its associated systems of work is identified and assessed to be a risk the employer must ensure that employees likely to be exposed to the risk and anyone supervising the employees are trained and provided with information and instruction. See Standard Operating Procedure example ([Appendix 3](#)).

4.17 Record Keeping

Registers:

- A risk assessment / control record must be completed for new and existing plant ([Appendix 2](#))
- A plant register which lists all identified plant within the University ([Appendix 1](#))
- If applicable, a confined space entry permit and a permit to work document must be completed in accordance with the UWA Confined Space Safety Procedures and UWA Permit to Work Safety Procedures <http://www.safety.uwa.edu.au/>
- An identified SOPs for working with plant ([Appendix 3](#))

5.0 Contact Information: telephone, e-mail address

For assistance and further information with implementing this Policy and Procedure

please contact the below:

- Safety and Health Office: phone: 9380 3938, email: sho@admin.uwa.edu.au
- web site: <http://www.safety.uwa.edu.au/>

6.0 References and Links (related policies/documents)

This Policy and Procedure has been developed in reference to the following documents and related legislative requirements:

- *Occupational Safety and Health Act 1984 (amended March 1999)*
- *Occupational Safety and Health Regulations 1996, Part 4 - Division 3 (amended December 1999/2002)*
- *National Standard for Plant [NOHSC:1010 (1994)]*
- *National Occupational Health and Safety Certification Standard for Users and Operators of Industrial Equipment [NOHSC: 1006 (2001)];*
- *Australian Standard (AS) 3920.1 Assurance of product quality – pressure equipment manufacture*
- *AS 1200 Boilers and Pressure Vessels (Formerly SAA Boiler Code)*
- *AS/NZS 1200 Pressure equipment (known as SAA Boiler Code)*
- *AS/NZS 1576 Scaffolding*
- *AS 1657 Fixed Platforms, Walkways, Stairways and Ladders-Design, Construction & Installation*
- *AS 1735 Lifts, escalators and moving walks*
- *AS 1891 Industrial safety belts & harnesses*
- *AS 2030 The approval, filling, inspection, testing and maintenance of cylinders for the storage and transport of compressed gases (known as SAA Gas Cylinders Code)*
- *AS 2211 Code of Practice for Laser Safety*
- *AS 2359 Part I Industrial Trucks*
- *AS 3509 LP gas fuel vessels for automotive use*
- *AS 4024.1-1996 Safeguarding of machinery Part 1: General principles*
- <http://www.safety.uwa.edu.au/>
 - UWA Policy for Personal Protective Equipment 1991
 - UWA Safety Risk Management Procedures
 - UWA Contractor Safety and Health Policy
 - UWA Radiation Policy and Procedures,
 - UWA Plant Safety Procedures
 - UWA Electrical Safety Procedures for Movable Equipment
 - **UWA Chemical Safety Procedures**
 - UWA Ergonomics Policy

7.0 Appendices

- [Appendix 1](#): Plant Register
- [Appendix 2](#): Purchase and Plant Hazard Checklist
- [Appendix 3](#): Standard Operating Procedure (example)
- [Appendix 4](#): Plant and Equipment Hazards
- [Appendix 5](#): Plant and Equipment Isolation and Tagging Procedures
- [Appendix 6](#): Definitions

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Work Area / School:..... Date

Plant item	Location	Function	Work system / SOP	Safety features	Operator competency and information
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
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Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		
Name: Model no: Item registration no: Design registration no:			Yes No		

APPENDIX 2: Purchase and Plant Hazard Checklist – please complete for each purchase and existing plant. To be conducted by nominated representative on behalf of Dean, Head of School / Centre)

Date Conducted: / /

School:.....

Purpose / Function of Plant:

Plant description:.....

What to Check / Record / Do	Rating / Response	Responsible Person	Date By When
<p>General:</p> <ul style="list-style-type: none"> • Will this purchase introduce hazards • Is design registration or notification required • Is item registration or licensing required • Is licensing, permit, certificate of competency required • Compliance with electrical safety legislation • Compliant with Quarantine Act 1908 and Quarantine Regulations 2000 • Refer and quote each Australian Standard and whether compliant • Instruction manuals, operating procedures (SOP), maintenance schedule and safety signage available • Training for those who will install, use or maintain • PPE available and required: footwear, eye, face, respirator, hearing protection, head protection, gloves (correct type for hazard), clothing and fall arrest harnesses • Workplace monitoring for: radiation, dust, fumes/vapours/mists, noise, heat/cold, vibration and lighting levels • Require medical monitoring / assessment required 	<p>Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No</p>		
<p>Physical:</p> <ul style="list-style-type: none"> • Hearing conservation / noise legislation compliant • Electrical hardware and components can be isolated and locked out as required • Equipment require RCD • Electric hand tools have access to a fixed or portable RCD • Testing and labelling applied to electrical equipment • Equipment has all isolators, fuses, switches, emergency stops, indicators, guards and electrical components clearly identified and locked out and followed • Seat restraints are fitted where attaching points are present in powered mobile plant • Rollover protective structures are in place if there is a risk of plant overturning • Pipes and other parts are adequately guarded or insulated • No loads will be suspended over, or travel over a person and will be restrained • Industrial lift trucks are fitted with appropriate lifting attachments specifically designed for the load to be lifted or moved • Scaffolding equipment erected, dismantled and signed accordingly • Confined space identified 	<p>Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No</p>		
What to Check / Record / Do	Rating / Response	Responsible Person	Date By When

<p>Chemical:</p> <ul style="list-style-type: none"> • Dangerous Goods legislation compliance • Compatible chemical / gas storage • Labelling and packaging (size, weight, type) • Hazardous Substances legislation compliance • Poisons and Drugs legislation / permit compliance • Carcinogens legislation compliance • Gases / Cryogenics legislation compliance • MSDS provided and accessible • Any special training required • Specialised first aid and emergency equipment required • Special spill/clean up equipment or procedures required • Special fire protection / emergency required • Product is correct substance and packaging free from contamination • Fume cupboards - AS/NZS 2243(8) compliant (regularly tested, not used for storage of chemicals and condition) <p>FLAMMABLE LIQUIDS:</p> <ul style="list-style-type: none"> • AS/NZS 1940 compliant, to be stored in a flammable liquids cabinet, quantities are not excessive, suitable containers, spark proof electrics, static energy control, Class B fire extinguisher near by, correct signage and bunding <p>COMPRESSED GASES:</p> <ul style="list-style-type: none"> • Reticulated from outside the building, number of cylinders inside rooms, cylinders secured, segregation of incompatible gases, transported on appropriate trolley, serviced regularly, tamper proof, correct signage and check lines carrying gas <p>ACIDS AND POISONS:</p> <ul style="list-style-type: none"> • Separate storage, corrosive/Acids cabinet, not excessive quantities, correctly signed, neutralising agents and decant in fume hood required 	<p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p>		
<p>Biological:</p> <ul style="list-style-type: none"> • Gene Technology Act 2000 and Regulations compliant • Certification of laboratories required • Biological safety cabinets and other equipment required • Specific room temperature required • Animal handling compliant • Any special training required • Cleaning, disposal and emergency required 	<p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p>		
<p>Radiation:</p> <ul style="list-style-type: none"> • Radiation legislation compliance • Ensure that appropriate safety devices, equipment, radiation monitoring and surveying devices are available and will be regularly tested and in good order • Personal radiation monitoring required • X-ray and laser safety compliant • Any special training required • Cleaning, disposal and emergency required 	<p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p> <p>Yes No</p>		
<p>What to Check / Record / Do</p>	<p>Rating / Response</p>	<p>Responsible Person</p>	<p>Date By When</p>

Ergonomic: <ul style="list-style-type: none"> • Compliant with manual handling / OOS legislation • Operator posture when using equipment compliant • Workplace layout, access and storage appropriate • Lighting, glare appropriate and compliant • Furniture should have rounded edges • Chairs adjustable and ergonomic as required • Delivery aspects, lifting equipment, building access, etc alright 	Yes No Yes No Yes No Yes No Yes No Yes No		
Environmental: <ul style="list-style-type: none"> • Will use of this product, its emissions, wastes or disposal require EPA licensing or other relevant licensing • Product durable • Product high content of recycled material • Product local or regional and sustainable • Product minimal or no environmental damage • Plant with high energy efficiency rating and long wearing • Disposal and waste procedures required • Environmental effect on discharge on: air, water, land • Potential effects on neighbours (odour, noise, etc) 	Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No Yes No		
Other: <ul style="list-style-type: none"> • Records required on registration, licensing, maintenance, commissioning, alteration, any relevant tests and training 	Yes No		

RISK MANAGEMENT:

Risks:

- Extreme - immediate action required
- High - implement immediate action
- Moderate - immediate action
- Low - remedial action within one month

Risk Control:

- Eliminate
- Substitute
- Engineering Control
- Administrative
- Personal Protective Equipment

APPENDIX 3: Plant Safety Standard Operating Procedure (SOPs) - example (Centrifuge)

School:	Standard Operating Procedure (SOP)																																	
<p>Task: Used for separating substances of different density or particle size, when suspended in a fluid, by spinning them about an axis in a suitable container.</p> <p>Equipment Used: If applicable, hoods</p> <ul style="list-style-type: none"> • Centrifuge with opening interlocking • Centrifuge without opening interlocking • Tubes • Chemicals 	<p>Date Issued:</p>																																	
<p>Hazards: (eg. physical, ergonomic, biological, chemical, radiation, psychological)*</p> <table border="0"> <tr> <td style="width: 5%;">1</td> <td>Mechanical failure of rotating parts</td> <td style="width: 5%;">1</td> <td>High</td> </tr> <tr> <td>2</td> <td>Contact with rotating parts</td> <td>2</td> <td>Medium</td> </tr> <tr> <td>3</td> <td>Sample leaks causing aerosols, stress corrosion and contamination</td> <td>3</td> <td>Low / Medium</td> </tr> <tr> <td>4</td> <td>Same imbalance causing machine movement / Walking</td> <td>4</td> <td>High</td> </tr> <tr> <td>5</td> <td>Fire or explosion</td> <td>5</td> <td>High</td> </tr> <tr> <td>6</td> <td>Health</td> <td>6</td> <td>Low</td> </tr> </table>	1	Mechanical failure of rotating parts	1	High	2	Contact with rotating parts	2	Medium	3	Sample leaks causing aerosols, stress corrosion and contamination	3	Low / Medium	4	Same imbalance causing machine movement / Walking	4	High	5	Fire or explosion	5	High	6	Health	6	Low	<p>Risk Assessment: (“High”, “Medium” or “Low”)</p>									
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<p>Safety Pre-requisites: (eg: Lock-out Tags, Secure Access, Trained/Licensed Operator, Written Work Order, Close Supervision, Warning Signs, Personal Protective Equipment)</p> <table border="0"> <tr> <td style="width: 5%;">1</td> <td>only suitable trained persons to operate centrifuge and in accordance with the instruction manual</td> <td>.....</td> </tr> <tr> <td>2</td> <td>closed shoes, laboratory coat buttoned, gloves, safety glasses</td> <td>.....</td> </tr> <tr> <td>3</td> <td>keep hair, loose clothing, and body parts away from the centrifuge while it is operating</td> <td>.....</td> </tr> <tr> <td>4</td> <td>centrifuge securely anchored</td> <td>.....</td> </tr> <tr> <td>5</td> <td>never centrifuge hazardous materials outside of an appropriate hood or containment facility</td> <td></td> </tr> <tr> <td>6</td> <td>never centrifuge flammable, explosive or corrosive materials</td> <td></td> </tr> <tr> <td>7</td> <td>never put hands in the rotor area unless the rotor is completely stopped</td> <td></td> </tr> <tr> <td>8</td> <td>never fill tubes while they are in the rotor</td> <td></td> </tr> <tr> <td>9</td> <td>never move the centrifuge while the rotor is spinning</td> <td></td> </tr> <tr> <td>10</td> <td>never leave a running centrifuge unattended</td> <td></td> </tr> <tr> <td>11</td> <td>keep rotors and buckets clean</td> <td></td> </tr> </table>	1	only suitable trained persons to operate centrifuge and in accordance with the instruction manual	2	closed shoes, laboratory coat buttoned, gloves, safety glasses	3	keep hair, loose clothing, and body parts away from the centrifuge while it is operating	4	centrifuge securely anchored	5	never centrifuge hazardous materials outside of an appropriate hood or containment facility		6	never centrifuge flammable, explosive or corrosive materials		7	never put hands in the rotor area unless the rotor is completely stopped		8	never fill tubes while they are in the rotor		9	never move the centrifuge while the rotor is spinning		10	never leave a running centrifuge unattended		11	keep rotors and buckets clean		<p>Prepared by: (insert names of Supervisor, Health & Safety Rep and any other person involved)</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
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*UWA Safety Risk Management Procedures. Will provide information on hazards and rating - http://www.safety.uwa.edu.au/policies/safety_risk_management_procedures

School	Standard Operating Procedure (SOP)
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<p>Procedure - Preparation:</p> <ol style="list-style-type: none"> 1. Are you an authorised operator? 1. Centrifuge bowl dry and spindle clean, centrifuge has no rough Spots, lid and seals clean, metal threads and rotor pins lubricated and O-rings intact and lubricated 2. Inspect glass tubes for correct type and for cracks 4. Place rotor on spindle, check drive pins and screw down lid 5. Follow the MSDS or chemical usage 	<p>Key Points: (<i>Warning, Key Check-point, Emergency/First Aid information (etc)</i>)</p> <p>Report any faults to your supervisor and tag the equipment not for use</p> <p>Always follow the chemical MSDS, emergency procedures and wear the appropriate PPE</p>
<p>Procedure - Operation:</p> <ol style="list-style-type: none"> 1. Fill in the maintenance log that details the number of runs, age of motor, rotation speed and dates of servicing and get it countersigned 2. Rotor seated correctly and the tubes inserted so that they are diagonally opposite (with lids tightly sealed) balanced 3. Set speed, time, temperature, acceleration and deceleration 4. Press enter / start then wait until rotor reaches full speed 5. Derate the rotor speed whenever: the rotor speed /temp combination exceeds the solubility of the gradient material and causes it to precipitate or the compartment load exceeds the maximum specified 	<p>Key Points: (<i>Warning, Key Check-point, Emergency/First Aid information (etc)</i>)</p> <p>Failure to reduce rotor speed under these specific conditions can cause rotor failure</p> <p>Balanced rotor within limits specified</p> <p>Tubes fitted correctly</p> <p>Never open the lid of a centrifuge or slow the rotor by hand or open the lid while rotor is in motion</p> <p>Radioactive material use, keep centrifuge behind an appropriate shield</p>
<p>Procedure - Transport / Clean-up / Disposal:</p> <ol style="list-style-type: none"> 1. When finished, wait for the time to count down to zero, or end the run by pressing stop 2. When the run is complete, open the door and unload the rotor. Regularly inspect the interior of the centrifuge chamber for accumulations of sample, dust or glass particles from broken sample tubes. Clean as required 3. Rinse rotor with distilled water or appropriate cleaning material and store in accordance with operating instruction manual 4. Sign off the log book 	<p>Key Points: (<i>Warning, Key Check-point, Emergency/First Aid information (etc)</i>)</p> <p>Autoclave and clean in accordance with instruction manual</p> <p>Observe warranty period</p> <p>Dispose of chemicals, glass and other equipment in accordance with safety precautions and MSDS</p>

APPENDIX 4: Plant and Equipment Hazards

Tools, machinery and equipment used at the UWA (often called 'plant') can cause injury and or health problems. The following table provides examples of hazards that may arise in a range of jobs where different equipment is used.

Work	Examples of tools, equipment, machinery ('plant')	Types of health or safety problems
Building	Ladder, concrete mixers, power tools, scaffolding, cranes, hoists, wheelbarrows	Falls, machinery breakdown or flying parts, entrapment in moving parts, falling objects
Diving	Breathing equipment, diving gear, spears and accessory equipment	Hitting and entrapment, falls, equipment malfunction, strains, drowning, cuts
Farms	Tractors, post hole borers, harvesters, forklifts, bulldozers, explosive powered tools, seeders, backhoes, etc	Roll over accidents, driving accidents, electrocution by hitting overhead powerlines, entrapment in moving parts, electrocution
Hospital / Medical	Lifts, boilers, sterilisation equipment, trolleys, syringes	Burns, dangerous chemical, back and arm sprains, needle stick injury
Kitchen	Stoves, electric knives, meat slicers, vegetable cutters, blenders, boilers	Burns, cuts, electric shocks, skin grazes, loss of fingers
Laboratory	Centrifuges, fume cupboards, chemical products	Burns, explosions, entrapment in moving parts, falling of objects, dangerous chemical, flying particles
Office	Computer equipment, lifts, boilers, desks and chairs, trolleys	Overuse problems, strains, burns, falls
Outdoor work	Manual and electric tools, terrain	Falls, strains, driving accidents, hitting objects, skin grazes
Plumbing	Welding equipment, pneumatic drills, electric eels, powered hand tools	Eye burns, sprains, hearing damage, vibration, injuries from drills or flying parts
Workshops	Lathes, presses, grinders, milling machines, conveyors	Flying particles and dusts, chemicals, entrapment in moving parts, fire
Warehouse	Conveyors, forklifts, scissor lifts, cranes, overhead gantry	Falls, entrapment in moving parts, falling of objects, or collapsing stacks, dislodgement of machine parts

APPENDIX 5: Plant and Equipment

Isolation and tagging procedures cover basic safety principles and isolation requirements to protect personnel and equipment. It is a requirement that, before any repairs or alterations are commenced, the electrical circuits or equipment to be worked on be entirely disconnected from the electricity supply, unless other adequate precautions are taken to prevent electric shock and the appropriate tagging/isolation compliance procedure is undertaken. Procedures to follow in order of hierarchy are:

Out of Service tag (yellow and black): is a notice to all persons to identify appliances or equipment that are out of service for repairs or alterations. These tags are fixed at common isolation points of the equipment that is unsafe or not to be operated



Danger tag (red and black): is a warning to all persons that the equipment is being worked on and must **not** be operated, as lives may be placed in danger. These tags are fixed and removed only by the **person** signing the tag, placed at common isolation points and removed upon completion of work



Lockout / Tagout: machines should be locked out whenever staff must work near dangerous parts that have *not* been guarded due to the location and whenever guards are removed for maintenance or repair, eg. electrical, mechanical, pneumatic and hydraulic lockout.

Appendix 6: Definitions

Boiler	Means a vessel or an arrangement of vessels and their interconnecting parts in which steam or other vapour is generated or in which water or other liquid is heated at a pressure above that of the atmosphere by the applicable products of combustion, electrical power or by similar high temperature and includes: superheaters, reheaters, economisers, boiling piping, supports, mounting, valves, gauges, fittings, controls
Boom-type elevating work platform	Means a telescoping device, hinged device, articulated device or any combination of those devices used to support a platform on which personnel, equipment and materials may be elevated
Building maintenance equipment	Means a suspended platform and associated equipment (including a building maintenance unit or a swing stage) which incorporates permanently installed overhead supports to provide access to the faces of a building or structure for maintenance or cleaning, but does not include a suspended scaffold
Commissioning	In relation to plant, means performing the necessary adjustments, tests and inspections before the plant is used to ensure that the plant is in full working order in accordance with the requirements specified in the design of the plant, and includes recommissioning
Conveyor	Means an apparatus or equipment worked by any power other than manual power and by which loads can be raised, lowered, transported or continuously driven by — <ul style="list-style-type: none"> (a) an endless belt, rope or chain or other similar means; (b) buckets, trays or other containers or fittings moved by an endless belt, rope, chain or other similar means; (c) a rotating screw; (d) a vibration or walking beam; or (e) a powered roller conveyor where the rolls are driven by an endless belt, rope or chain and includes the supporting structure, auxiliary equipment and gear used in connection with the conveyor
Crane	Means plant that is intended for the raising or lowering of a load and moving a load horizontally and <ul style="list-style-type: none"> (a) includes the supporting structure of the crane and its foundations; (b) does not include any industrial lift truck, earthmoving machinery, amusement structure, tractor, industrial robot, conveyor, building maintenance equipment, suspended scaffold or lift
Electrical plant	Means plant which consumes, converts or generates electricity
Elevating work platform	Means a telescoping device, scissor device or articulating device or any combination of those devices used to position personnel, equipment and materials to and from workplaces located above the support surface
Gas cylinder	means a rigid pressure vessel designed for the storage and transport of gas under pressure and to which AS 2030 applies that does not have more than 3000 litres water capacity and is without openings or integral attachments on the shell other than at the ends
Hoist	Means an appliance intended for raising or lowering a load or persons and <ul style="list-style-type: none"> (a) includes an elevating work platform, a mast-climbing work platform, a people and materials hoist, a scaffold hoist and a serial hoist; (b) does not include a lift or building maintenance equipment
Industrial lift truck	Means powered mobile plant designed to move goods, materials or equipment and which is equipped with an elevating load carriage and which usually has a load-holding attachment but does not include a mobile crane or earthmoving machinery
Interlocked	In relation to a plant's guarding device or machine element means the connection between the guarding device or machine element and the plant's

	<p>control system or power system by which connection</p> <p>(a) access is allowed to the plant's moving parts when those parts are not operating; and</p> <p>(b) moving parts are prevented from starting up or operating when access is available to those parts</p>
Laser	Means any device that can produce or amplify electromagnetic radiation in the wave length range from 100 nanometres to one millimetre by the process of controlled stimulated emission but does not include any electric light globe, fluorescent light tube, electric radiator used for heating, radio or video communication equipment, domestic cooking appliance using high powered lamps or navigation and search light
Lift	Means any permanent plant (or plant that is intended to be permanent) which is in, or attached to, a building or structure and by means of which persons, goods or materials may be raised or lowered within or on a car cage or a platform and the movement of which is restricted by a guide or guides and includes an apparatus in the nature of a chair lift, escalator, moving walk or stairway lift and any supporting structure, machinery, equipment, gear, lift well, enclosures and entrances
Mast climbing work platform	Means a hoist having a working platform for the support or raising of personnel, equipment and materials to the working position by means of a drive system which moves along an extendable mast (which may be tied to a building) but does not include a lift or building maintenance equipment
Operator protective devices	Includes roll-over protective structures, falling object protective structures, operator restraining devices and seat belts
Presence sensing safeguarding system	<p>(a) a sensing system employing one or more forms of radiation which can be either self-generated or generated by pressure;</p> <p>(b) the interface between the final switching devices of the sensing system and the machine primary control elements; and</p> <p>(c) the capacity of a machine to stop when the presence of a person or part of a person within the sensing field will cause the dangerous parts of a machine to be brought to a safe state</p>
Pressure equipment	Means a boiler, pressure vessel and pressure piping to which AS/NZS 1200 applies and having a hazard level of A, B, C or D according to the criteria set out in AS 3920.1 or AS 4343
Pressure vessel	Means a vessel subject to internal or external pressure and — <p>(a) includes interconnected parts and components, valves, gauges and other fittings up to the first point of connection to connecting piping, fired heaters and gas cylinder;</p> <p>(b) does not include any boiler or pressure piping</p>
Regulatory Authority	Means any Commonwealth, State or Territory authority, other than the Commissioner, with responsibility for plant safety
Vehicle hoist	Means a vehicle-hoisting device, the purpose of which is to provide accessibility for convenient under-chassis examination or service