



Australian Government

Department of Education, Employment and Workplace Relations

RIIPRE301A Conduct electrowinning/electrorefining operations

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the conduct of electrowinning/electrorefining in the metalliferous mining industry. It includes planning and preparing for electrowinning/electrorefining, monitoring electrowinning/electrorefining, pulling and stripping plates, shutting down in sequence and/or isolating equipment, and conducting housekeeping activities and returning cell to service. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in an operational role at worksites within:

- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for electrowinning/ electrorefining	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Receive, interpret and clarify shift changeover details 1.3. Communicate with other personnel 1.4. Select personal protective equipment appropriate for work activities 1.5. Select appropriate type of auxiliary equipment for work activities 1.6. Perform equipment pre-start checks 1.7. Identify, address and report potential risks and hazards 1.8. Identify, address and report environmental issues 1.9. Adhere to emergency procedures 1.10. Use approved dust suppression and extraction methods 1.11. Ensure area is well ventilated
2. Monitor electrowinning/ electrorefining	2.1. Monitor , gather and interpret data from equipment indicators 2.2. Monitor and adjust solution volume, feed quality and rate of flow in cells 2.3. Monitor cooling system according to site procedures 2.4. Monitor and maintain temperature, voltage and amps. 2.5. Continuously monitor operations 2.6. Minimise and monitor emissions 2.7. Complete all required documentation 2.8. Pass on end of shift information to oncoming shift 2.9. Conduct cell inspections 2.10. Observe and follow electrical safety techniques
3. Pull and strip plates	3.1. Ensure that electrowinning/electrorefining systems are safe for plate removal 3.2. Pull and strip plates using appropriate equipment 3.3. Inspect electrodes and identify rejects

	3.4.strip plates to site requirements 3.5.Stack and dispatch stripping products 3.6.Clean plates for reuse 3.7.Handle stripping products safely
4. Shutdown in sequence and/or isolate equipment	4.1.Shutdown or isolate equipment based on process and safety requirements 4.2.Perform post shutdown or isolation checks 4.3.Plan for shutdown/isolation and returning cells to service
5. Conduct housekeeping activities and return cell to service	5.1.Clean plant 5.2.Identify, address and report hazards 5.3.Maintain bus-bar cleanliness 5.4.Isolate cell and remove scale from anodes and cell according to site requirements 5.5.Dispose of scale in accordance with site procedures 5.6.Return cell to service in correct sequence

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to conduct electrowinning/electrorefining operations:

- apply legislative, organisation and site requirements and procedures for conducting electrowinning/electrorefining operations
- carry out fault finding
- identify hazards
- handle hazardous substances
- interpret reports
- apply lifting techniques (manual, cranes and loads)
- maintain records
- report defects
- employ safe work practices
- use hand and power tools

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to conduct electrowinning/electrorefining operations:

- breakdown procedures
- contaminant identification
- electrowinning/ electrorefining principles
- electrical hazards
- emergency procedures
- environmental principles
- equipment operating parameters
- equipment safety requirements
- hazardous substances procedures and consequences of spills
- isolation procedures
- metallurgical and technical data
- operational procedures and checks
- pumping system and flow charts (pipeline and sprinkler systems)
- reagent types
- sampling
- site procedures

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| <ul style="list-style-type: none">• electrowinning/ electrorefining safety requirements• types of ores• wet and dry working procedures |
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Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for conducting electrowinning/electrorefining operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of electrowinning/electrorefining operations • working with others to undertake and complete the electrowinning/electrorefining operations in a way that meets all of the required outcomes • consistent timely completion of electrowinning/electrorefining operations that safely, effectively and efficiently meet the required outcomes
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • Assessment of this competency requires typical resources normally used in a resources and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those

	required on the job. • Customisation of assessment and delivery environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Where applicable, physical resources should include equipment modified for people with disabilities. Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and complete the electrowinning/electrorefining operations
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Relevant compliance documentation may include:	• legislative, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Legislation may include Acts and regulations dealing with:	• mining safety and health • mine inspection • OHS • explosives
Auxiliary equipment may be anything that is portable and mobile that is not part of the fixed infrastructure, and may include:	• compressors • distribution control systems (DCS) • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools
Pre-start checks may include:	• availability of equipment (e.g. conveyor or gantry) • detection of conditions that are unusual • personnel availability • job requirements • fluid levels • walk through plant
Environmental issues may include:	• drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off/spills • waste management and disposal

	• water quality • management of residues
Monitoring may include the checking of:	• solution levels • spillages and hot spots • flow rates • pressures • power draw • emission levels • reagent addition
Post-shutdown checks are like pre-start checks.	
Equipment and plant cleaning methods may include:	• digging
Plant may include:	• tanks • lines • pumps • piping • cells • plates • fixed stripping machines • monorails
Indicator readings may include:	• current flow • solvent density • restrictions • air flows • pressure • unusual noises • temperature
Start-up procedures may include:	• cameras and monitors • interlocks • distribution control system • pumping system • scuttling pumps • pipes and flanges • drive belts • valves • visual and audio warning devices and lights • suppression systems • cells and surround site

Materials may include:	• slurry • solution • reagents
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Unit Sector(s)

Refining

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.