



Australian Government

Department of Education, Employment and Workplace Relations

RIIPSM302A Cast ingots

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the casting of ingots in the metalliferous mining industry. It includes planning and preparing for casting operations, preparing moulds/laundry systems, casting metal, removing cast metal, shutting down in sequence and/or isolating equipment, and carrying out housekeeping activities. 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 casting operations	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Receive, interpret and clarify shift change over details 1.3. Select personal protective equipment appropriate for work activities 1.4. Select appropriate type of equipment 1.5. Perform equipment pre-start checks 1.6. Carry out start-up procedures 1.7. Identify, address and report potential risks and hazards 1.8. Communicate with other equipment operators 1.9. Identify, address and report environmental issues 1.10. Adhere to emergency procedures 1.11. Ensure area is well ventilated 1.12. Mould, launder and ladle system is adjusted, to operate within specifications
2. Prepare moulds/laundry system	2.1. Dress moulds /launder system 2.2. Check for defects against specifications 2.3. Prepare moulding pit according to site procedures 2.4. Dry product according to site procedures 2.5. Strip and cleanout moulding pit where required 2.6. Check cooling system for operation against specifications
3. Cast metal	3.1. Teem/tap liquid metal into ladles and/or launder system where required 3.2. Cast liquid metal to moulds 3.3. Take temperature and sample of the liquid to ensure pour meets specifications 3.4. Identify need for, and adjust composition of pour with additives 3.5. Monitor cast continuously
4. Remove cast metal	4.1. Knock off mould plates when mould has been bumped out

	4.2. Repair launders where required 4.3. Identify and remove damaged and faulty mould 4.4. Remove slides from ladles, repair and reposition slides 4.5. Inspect for quality, chips and mark according to site procedures and quality parameters 4.6. Prepare ingots, anodes or bullion for transport and storage according to work plans
5. Shutdown in sequence and/or isolate equipment	5.1. Shutdown and/or isolate equipment based on process and safety requirements 5.2. Perform post shutdown and/or isolation checks
6. Carry out housekeeping activities	6.1. Clean equipment 6.2. Clean and store auxiliary services equipment 6.3. Pass on end of shift information to incoming shift 6.4. Complete all required documentation

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 cast ingots:

- apply legislative, organisation and site requirements and procedures for casting ingots
- deal with hazards
- receive and deploy materials
- monitoring and adjustment in process
- handle chemicals safely
- facilitate smooth product flow
- communicate skills
- deal with faults and variances

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 cast ingots:

- precautions necessary to ensure safety
- potential dangers inherent in specific plant and equipment
- safe working procedures and systems
- fume extraction requirements and methods
- power unit requirements
- specifications of moulds, bottom plates, trumpets, ingots, anodes, bullion
- application of process to different base metals
- teeming/tapping schedules
- ingot, anode and bullion weight and markers relationship
- specification and use of tiles
- storage and scheduling requirements for production
- plant requirements
- service requirements and specifications
- fault finding
- materials specifications
- limits of authority

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 casting ingots • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of casting ingots • working with others to undertake and complete the casting of ingots in a way that meets all of the required outcomes • consistent timely completion of the casting of ingots that safely, effectively and efficiently meets 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 casting of ingots
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 • environment
Personal protective equipment may include:	• helmet • safety footwear • hearing protection • gloves • eye/face protection • respiratory protection • heat resistant clothing
Site environmental issues may include:	• drainage • dust and fumes • emissions • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality
Mould and/or launder system preparation equipment may include:	• air chisel • burning bars • jackhammers • hand hammer • explosives

	• forklift/crane
Preparing moulds or launder systems may include:	• levelling • clamping in place • peening and chipping • removal of broken lugs • checking for wear, straight shaft • condition of seals • powdering the mould
Mould and/or launder system faults may include:	• moulds not level • metal under mould • mould bowed or cracked • dry slurry • insufficient refractory (on launders) • burners not operating
Moulds may include stools, or other launder and ladle systems.	
Teeming/tapping may include:	• up-run • down-hill • double hole • single hole
Monitoring of cast may include:	• launders • ladles • tun dishes • water and slurry sprays • correct height of cast in mould • checked lug area for slurry build up
Problems with cast may include:	• over/unfilled ladles or moulds • build up splash • mould hot spots • stuck anodes • temperature of mould too cold • slurry wrong density • wheel losing home position • wheel inhibited (stops/ stuck) • metal incorrect temperature on furnace roll down
Defective moulds and bottom plates may include:	• scrappy top • badly cracked • wet • incorrectly seated

	• cracks • excess slurry
Shutdown procedures may include:	• drain casting ladles • turn off water, air and slurry sprays/burners • blow out moulds • flush slurry sprays • remove launders • release air
Production documentation may include:	• tonnages • quality • analysis/testing • identity • tracking
Services may include:	• electricity • air • water • gas • fuel oil
Hazards may include:	• rail and road movement • cranes • molten metal • hot materials • noise • air pollution • sharp objects • moving machinery • heights • falling objects • gases • chemicals
Raw materials may include those involved in:	• mould and stool construction
Appropriate authority may include:	• maintenance engineering personnel • management
Fault and variances may occur in:	• product • plant • equipment

Unit Sector(s)

Smelting

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.