



Australian Government

Department of Education, Employment and Workplace Relations

RIIPSM307A Control molten metal in holding furnace/vessel

Release: 1

RIIPSM307A Control molten metal in holding furnace/vessel

Modification History

Not applicable.

Unit Descriptor

This unit covers the controlling of molten metal in a holding furnace/vessel in the metalliferous mining industry. It includes preparing for holding furnace operations, operating and monitoring holding furnace operations, and discharging matte and slag to matte and slag pots. 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

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Prepare for holding furnace operations	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Establish and maintain communication with other personnel using approved communication methods 1.3. Select personal protective equipment appropriate for work activities 1.4. Identify, address and report potential risks and hazards 1.5. Identify, address and report environmental issues 1.6. Follow emergency procedures to ensure safety of personnel and plant 1.7. Check and test remote control and monitoring systems for correct operation 1.8. Plan and put work area ventilation in place
2. Operate and monitor holding furnace operations	2.1. Carry out plant and equipment start-up checks and procedures according to plant/equipment configurations and system requirements 2.2. Monitor holding furnace operations 2.3. Monitor and receive matte and/or slag flow from furnace 2.4. Control furnace rotation/tilting within recommended rate and angle parameters to efficiently separate matte and slag 2.5. Control main and secondary burner operation to hold constant, recommended matte and slag temperature 2.6. Carry out holding furnace drive equipment diagnoses to monitor and maintain correct, safe operation 2.7. Check on holding furnace operations at regular intervals during the shift and rectify identified faults 2.8. Plan and organise matte supply to converter with other personnel and adjust tonnage to meet requirements 2.9. Maintain cleanliness of spouts to allow consistent, continuous flow of molten metal

<p>3. Discharge matte and slag to matte and slag pots</p>	<p>3.1. Ensure pot area is clear of personnel and machinery before pouring commences</p> <p>3.2. Position pot correctly to avoid splash, spillage or damage</p> <p>3.3. Rotate vessel/pot at correct angle to ensure an even flow of matte and slag</p> <p>3.4. Assess matte and slag levels and pour slag and dispose of matte ensuring that pot is not overfilled</p> <p>3.5. Take and measure samples to ensure the slag and matte quantity is in an acceptable range</p>
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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 control molten metal in a holding furnace/vessel:

- apply legislative, organisation and site requirements and procedures for controlling molten metal in a holding furnace/vessel
- troubleshoot
- apply precautions necessary for safe working
- use protective clothing and equipment
- apply operating procedures
- report faults
- recognise limits of authority
- apply team working practices
- communicate information
- 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 controlling molten metal in a holding furnace/vessel:

- principles of holding vessel/furnace operation
- characteristics of molten metal (basic)
- molten metal pouring procedures
- furnace components and function
- troubleshooting
- combustion principles
- importance of flame patterns/flame impingement
- hazards associated with hot molten metal
- safe working procedures with molten metal
- protective equipment for working with hot materials
- potential dangers inherent in specific plant and equipment
- pot positioning
- sampling
- decanting
- despatch of waste products
- storage and scheduling requirements for production

- plant requirements for various schedules
- service requirements and specifications
- fault finding, rectification and reporting
- materials specifications
- standard operating procedures

Evidence Guide

<p>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.</p>	
<p>Overview of assessment</p>	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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:</p> <ul style="list-style-type: none"> • knowledge of the requirements, procedures and instructions for controlling molten metal in a holding furnace/vessel • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of controlling molten metal in a holding furnace/vessel • working with others to undertake and complete the controlling of molten metal in a holding furnace/vessel in a way that meets all of the required outcomes • consistent timely completion of controlling molten metal in a holding furnace/vessel that safely, effectively and efficiently meets the required outcomes
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • 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

	<p>assessment should not be greater than those required on the job.</p> <ul style="list-style-type: none"> • 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	<p>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:</p> <ul style="list-style-type: none"> • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • working with others to undertake and complete the controlling of molten metal in a holding furnace/vessel
Guidance information for assessment	<p>Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.</p>

Range Statement

<p>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.</p>	
<p>Relevant compliance documentation may include:</p>	<ul style="list-style-type: none"> • 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
<p>Legislation may include Acts and regulations dealing with:</p>	<ul style="list-style-type: none"> • mining safety and health • mine inspection • OHS • explosives • environment
<p>Personal protective equipment may include:</p>	<ul style="list-style-type: none"> • helmet • safety footwear • hearing protection • gloves • eye/face protection • respiratory protection
<p>Hazards may include:</p>	<ul style="list-style-type: none"> • mobile plant/cranes • molten metal • hot materials • noise • air pollution • sharp objects • moving machinery • heights • falling objects • gases
<p>Environmental issues may include:</p>	<ul style="list-style-type: none"> • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals

	<ul style="list-style-type: none"> • noise • recycling • run-off/spills • waste management and disposal • water quality
Monitoring may include:	<ul style="list-style-type: none"> • blockages and spillages • feed rates • overloads • pressures • power draw • wear and tear • emissions • levels • temperatures • on-stream analysis (OSA) • filtering • corrosion
Furnace problems may include:	<ul style="list-style-type: none"> • temperatures too high or too low during oxidation and charging • air flow too low for burners • fuel flow too low or too high, surging • level in furnace too high or low • metal splashes • feed not to specification • matte grade
Fault and variances may occur in:	<ul style="list-style-type: none"> • product • plant • equipment
Burners may be:	<ul style="list-style-type: none"> • diesel • natural gas
Pre-start checks may include:	<ul style="list-style-type: none"> • availability of equipment • detection of conditions that are unusual • job requirements • levels • pressures • flows • communications • cameras and monitoring • interlocks • distribution control system • launders

	<ul style="list-style-type: none"> • hydraulic systems • pumps and pumping systems • screen, pipe, valve • visual and audible warning devices and lights • suppression systems • motors • availability of oxygen and plant air • cooling water supply • diesel supply • fans and draft systems • compressors
Equipment indicator readings may include:	<ul style="list-style-type: none"> • current • flow/levels • pressure • speed
Maintenance may include:	<ul style="list-style-type: none"> • lubrication • minor adjustments to operational plant • cleaning plant, equipment and work area
Indicator readings may include:	<ul style="list-style-type: none"> • alarms • distribution control systems • mimic panel • screens • temperature • flow • weight • pressure

Unit Sector(s)

Smelting

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.