



Australian Government

Department of Education, Employment and Workplace Relations

RIIPSM201A Tap furnaces

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the tapping of furnaces in the metalliferous mining industries industry. It includes preparing for furnace tapping, tapping molten metal from furnaces, completing the tapping process, and maintaining tapping equipment. 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. Prepare for furnace tapping	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. Use approved dust suppression and extraction methods 1.8. Ventilate work area before entry 1.9. Check availability and operational readiness of all tools and equipment required for tapping 1.10. Set up equipment ready for tapping to standard work procedures 1.11. Correctly position holding vessels/ladles in readiness to receive molten metal and slag
2. Tap molten metal from furnace	2.1. Carry out plant and equipment start-up checks and procedures according to plant/equipment configurations and system requirements 2.2. Drill, or make tap hole with oxy lance, and establish molten metal flow 2.3. Ignite burners and correctly apply to ensure molten metal does not solidify 2.4. Identify and control interference with molten metal flow to ensure quality and production targets 2.5. Take samples at appropriate bath heights for metallurgical testing to quality requirements
3. Complete tapping process	3.1. Insert and secure tap-hole seal to stop molten metal flow

	3.2. Clean and clear tapping area of potential safety hazards 3.3. Clean and stow all tools and equipment in readiness for next tapping operation 3.4. Pass on shift changeover details to oncoming shift
4. Maintain tapping equipment	4.1. Obtain and/or manufacture tap-hole seals to specification 4.2. Replace temperature monitoring equipment to furnace safety and operational parameters 4.3. Remove and install tapping blocks to furnace safety and operational parameters 4.4. Provide support for maintenance personnel when required to organisation's requirements

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 tap furnaces:

- apply legislative, organisation and site requirements and procedures for tapping furnaces
- troubleshoot
- work with/handle high temperature materials
- identify hazards
- interpret reports,
- use lifting techniques
- monitor system/plant
- report defects
- use fault finding, rectification and reporting techniques
- use 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 tap furnaces:

- principles of furnace operation
- characteristics of molten metal
- molten metal tapping procedures
- furnace tapping components
- trouble shooting
- combustion principles
- 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
- safe working procedures and systems
- dobie bar and clay gun positioning
- sampling methods
- despatch of waste products
- plant requirements for various schedules
- service requirements and specifications

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 tapping furnaces • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of furnace tapping • working with others to undertake and complete the furnace tapping in a way that meets all of the required outcomes • consistent timely completion of furnace tapping 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 furnace tapping
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
Hazards may include:	• cranes • molten metal • hot materials • noise • air pollution • sharp objects • moving machinery • heights • falling objects • hot gases
Environmental issues may include:	• drainage • dust (dump) • emissions • hazardous chemicals

	• noise • recycling • run-off • spills • waste management and disposal • water quality
Equipment and plant cleaning methods may include:	• degreasing • forced air • sweeping
Equipment indicator readings may include:	• current • flow • level • pressure • speed • unusual noise • vibration
Start-up checks and procedures may include:	• availability of equipment • detection of conditions that are unusual • job requirements • levels • communications • interlocks • distribution control system • launders • hydraulic systems • pumps and pumping systems • pipes and flanges • drive belts • valves • visual and audible warning devices and lights • suppression systems
Burners may be:	• diesel • natural gas
Furnaces may be:	• fixed - vertical/cylindrical • rotary - vertical/cylindrical
Furnace problems may include:	• temperatures too high or too low • level in furnace too high or low • metal splashes • feed not to specification • foaming • solidification

	• un-burnt feed • contamination (e.g. ceramics, bricks) • poor metallurgical conditions • poor feed mix • poor feed moisture control
Maintenance may include:	• lubrication • minor adjustments to operational plant • cleaning plant, equipment and work area • installation/removal of devices • making furnace accessories
Services may include:	• electricity • air • cooling water • potable water • gas • diesel
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.