



Australian Government

Department of Education, Employment and Workplace Relations

RIIPSM304A Operate furnaces

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the operation of furnaces in the metalliferous mining industry. It includes planning and preparing for furnace operations, starting-up the furnace, monitoring and controlling the smelting process, and shutting down the furnace. 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 furnace operations	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Receive, interpret and clarify shift changeover details 1.3. Establish and maintain communications with other personnel using approved communication methods 1.4. Select personal protective equipment appropriate for work activities 1.5. Identify, address and report potential risks and hazards 1.6. Identify, address and report environmental issues 1.7. Check records and record outstanding maintenance inspections and identified defects
2. Start-up furnace	2.1. Complete computer systems and equipment pre-start checks 2.2. Start-up furnace according to operating procedures 2.3. Stabilise system to produce in-specification product at specified rates
3. Monitor and control the smelting process	3.1. Complete routine checks, log and paper work 3.2. Recognise the signs of potential and actual problems 3.3. Take action to minimise the impact on safety, health, the environment and business of potential and actual problems 3.4. Monitor and trim plant to achieve required rates and quality while maximising plant efficiency 3.5. Operate furnace according to operating requirements and procedures
4. Shutdown furnace	4.1. Determine type of shutdown required 4.2. Give warning of shutdown 4.3. Shutdown furnace system according to established operating procedures for type of shutdown

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 operate furnaces:

- apply legislative, organisation and site requirements and procedures for operating furnaces
- operate computers
- 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 operate furnaces:

- principles of operation
- furnace components:
 - insulation (refractory)
 - physics of operation
 - chemistry of operation
- importance of flame patterns/flame impingement
- methods of resolving problem

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 operating furnaces • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of furnace operations • working with others to undertake and complete the furnace operations in a way that meets all of the required outcomes • consistent timely completion of furnace operations 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 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 • environment
Site environmental issues may include:	• drainage • dust and fumes • emissions • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality
Equipment pre-start checks may include:	• availability of equipment • detection of conditions that are unusual • job requirements • personnel availability • levels • pressures • flows • vibration • communications • agitators • cameras and monitoring • interlocks

	• distribution control system • launders • hydraulic systems • pumps and pumping systems • screen, pipe, valve • valves • visual and audible warning devices and lights • suppression systems • motors • availability of oxygen and blower and plant air • cooling water supply • fans and draft systems
Furnaces may include:	• thermal cracking furnaces • catalytic cracking furnaces • cabin type • cylindrical or vertical • fixed - vertical/cylindrical (horizontal) • rotary - vertical/cylindrical (horizontal)
Furnace equipment may include:	• pumps • valves • utilities and services • heat exchangers and/or scrubbers
Furnace problems may include:	• temperature too high or low during smelting • gas, oil, oxygen, coal and air flow too low during smelting • shell leaks • fuel flow too low or high, surging • level in furnace too high or low • metal splashes • feed not to specifications • emissions not to standard • metallurgy not to standard
Monitoring may include:	• blockages and spillages • feed rates • overloads • pressures • power draw • wear and tear • emissions • levels • temperatures

	• moisture content • on-stream analysis (OSA) • filtering • corrosion
Type of shutdown may include:	• planned - maintenance; scheduled • unplanned - services failure; break-out; environmental
Combustion components may be:	• diesel • natural gas • oxygen • oil • blower air
Equipment indicator readings may include:	• current • flow • levels • pressure • weight • speed • unusual noises • vibrations

Unit Sector(s)

Smelting

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.