



Australian Government

Department of Education, Employment and Workplace Relations

PMASMELT261B Bake carbon anodes

Revision Number: 1

PMASMELT261B Bake carbon anodes

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This competency applies to plant technicians who are required to operate the carbon bake processes in the production of carbon anodes used in the aluminium smelting process.
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Application of the Unit

Application of the unit	<p>This competency unit typically covers items of equipment, such as:</p> <ul style="list-style-type: none"> • carbon anode furnace • ancillary equipment, such as scrubbers and fans • conveyors • cranes (may require <i>PMASUP237B Undertake crane, dogging and load transfer operations</i>) • mobile equipment, such as scissor lifts, forklifts and front-end loaders (may require other competencies, eg <i>TDTD1097B Operate a forklift for licensed load shifting</i> or <i>MSAPMSUP205A Transfer loads for unlicensed load shifting</i>). <p>The plant technician would:</p> <ul style="list-style-type: none"> • monitor the carbon bake process • prepare and conduct fire change • change thermocouples • monitor furnace refractory condition • inspect scrubbers • operate materials handling equipment • recognise and respond to 'out-of-parameter' issues • respond to emergency situations • identify and control hazards in the workplace. <p>Generally the operator would be part of a team during start up and shut down procedures and would be expected to be capable of demonstrating competence in all parts of this unit. At all times they would be liaising and cooperating with other members of the team.</p> <p>This unit does not require the operation of a central control panel</p>
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units			
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Employability Skills Information

Employability skills	This unit contains employability skills.
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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 operations.	1.1. Interpret and confirm work requirements before proceeding 1.2. Identify and control hazards 1.3. Ensure appropriate authorisations have been obtained/issued 1.4. Identify work flow path blockages (interruptions or bottlenecks).
2. Conduct pre-start requirements to procedures.	2.1. Conduct routine pre-start equipment checks 2.2. Conduct isolation as appropriate for pre-start inspections 2.3. Prepare equipment for operation 2.4. Complete routine equipment checklists 2.5. Complete reports as required for equipment inspections.
3. Conduct carbon bake operations to procedures.	3.1. Start up anode bake and ancillary equipment 3.2. Monitor equipment operation and check operational variables are within parameters. 3.3. Verify equipment performance throughout the process 3.4. Apply operating principles to identify problems and take appropriate action 3.5. Shut down anode bake and ancillary equipment as required 3.6. Conduct routine housekeeping activities 3.7. Complete records as required for equipment operation and performance.
4. Isolate and de-isolate plant	4.1. Isolate plant 4.2. Make safe for required work 4.3. Check plant is ready to be returned to service 4.4. Prepare plant for return to service

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills

Competence includes being able to demonstrate the following:

- efficient and effective operation of plant/equipment
- hazard analysis
- completing plant records
- communication
- problem solving

Competence includes responding to emergency situations such as:

- open furnace pits
- ring main risers
- fire shaft pit
- riser shaft
- natural gas usage
- rain and water in electrical ducts
- explosions due to loss of draft
- evacuation due to fire
- loss of power
- excessive emissions of fumes or particulate
- equipment failure
- recognising hazards associated with reactive alumina, tar, pitch, kaowool, suspended loads and heat stress.

Troubleshooting a range of problems which could include:

- anode baking equipment
- anode stacker cranes
- conveyors
- rotators
- burner tips
- port plates
- equipment failure.

Required knowledge

Competence includes a comprehensive understanding of the carbon bake process and equipment principles and typical problems to a level needed to control the operation, and recognise and resolve operational problems. In particular it includes:

- awareness of hazardous materials, recognition of spills or escapes, personal protective

REQUIRED SKILLS AND KNOWLEDGE

equipment required, isolation and clean up requirements

and knowledge of:

- all items on a schematic of the carbon bake process and the function of each
- basic principles of operation of main equipment items, including scrubbers, port plates, thermocouples and burner tips
- basic physics of operation, including effects of temperature, conveyor speed and time on anode quality
- basic understanding of the product specifications and variations required on the input and output side
- isolating a problem to an item of equipment/stage of process
- methods of resolving problems.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Assessment for this unit of competency will be on an operating plant. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation.

Simulation may be required to allow for timely assessment of parts of this competency unit (eg Elements 2, 5). Simulation should be based on the actual plant and will include walk-throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios and role plays.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action.

The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look to see that:

- emergency responses are known
- hazards are recognised and all site requirements to reduce or remove hazards are known and completed as part of the job
- early warning signs of equipment/processes needing attention or with potential problems are recognised, that is, monitoring systems in the carbon anode baking process, including equipment, material handling systems and mobile equipment.

These aspects may be best assessed using a range of scenarios/case studies/what-ifs as the stimulus with a walk-through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations that may have been generated from the past

EVIDENCE GUIDE	
	incident history of the plant, incidents on similar plants around the world, hazard analysis activities and similar sources.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. A bank of scenarios/case studies/what-ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.
Method of assessment	<p>In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. Consider co-assessment with other relevant units.</p> <p>This competency may be assessed in conjunction with:</p> <ul style="list-style-type: none"> • <i>MSAPMOHS200A Work safely</i> • <i>MSAPMOHS110A Follow emergency response procedures</i> • <i>PMASUP237B Undertake crane, dogging and load transfer operations</i> • <i>TDTD1097B Operate a forklift</i> • <i>MSAPMSUP205A Transfer loads</i> <p>or other units which are relevant to the job.</p>
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the assessee and the work being performed.

Range Statement

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. Add any 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.</p>	
Codes of practice/ standards	Where reference is made to industry codes of practice, and/or Australian/international standards, the latest version must be used.
Appropriate action	<p>Appropriate action includes:</p> <ul style="list-style-type: none"> • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Emergency responses	<p>Emergency responses include those related to:</p> <ul style="list-style-type: none"> • rain and water in electrical ducts • explosions due to loss of draft • evacuation due to fire • loss of power • excessive emissions of fumes or particulates • equipment failure • leaks/loss of containment • equipment failure • hazards and incidents, site safety procedures • flow path blockages • authorisations and communication processes for normal and emergency situations must follow site procedure
Equipment and tools	<p>Equipment and tools may include:</p> <ul style="list-style-type: none"> • hand tools • harnesses and slings • materials handling equipment.
Hazards	<p>Hazards may include:</p> <ul style="list-style-type: none"> • open furnace pits, ring main risers, fire shaft pit, riser shaft, natural gas

RANGE STATEMENT	
	<ul style="list-style-type: none"> • heat (burns, dehydration and heat stress) • energy sources, eg hydraulic, pneumatic and electric • high pressure piping and valves • pinch and crush points • moisture • banned items • mobile equipment and pedestrian interaction • furnace emissions • suspended loads and roller conveyors • hazardous materials, eg reactive alumina, kaowool, tar and pitch • molten materials.
Hazard control measures	Hazard control measures should follow the hierarchy of control, be specific to the hazard and work area and include relevant Personal Protective Equipment
Housekeeping	Housekeeping procedure may include cleaning the area, removal of contaminants, safety inspections and rectification of issues that could compromise safety.
Instrument/electrical systems	<p>Instrument/electrical systems may include:</p> <ul style="list-style-type: none"> • emergency shutdown systems • fire systems • pressure and temperature control systems • communications systems • utility systems.
Isolation	Isolation refers to the complete isolation of the equipment from all sources of power or energy or isolate process flows and movement of machinery such to render it safe to work on as per site procedure.
Monitor and adjust operational variations	<p>Monitor and adjust operational variations using troubleshooting techniques may refer to the use of:</p> <ul style="list-style-type: none"> • historical data and records of common faults • troubleshooting lists and directives • site procedures.
Out-of-parameter issues	<p>Out-of-parameter issues, faults and problems may include:</p> <ul style="list-style-type: none"> • temperature and oxygen fluctuations • production line speed variations • variation of product specification on the input and output side

RANGE STATEMENT	
	<ul style="list-style-type: none"> • electrical problems • instruments and equipment requiring cleaning • equipment mechanical problems • flow path blockages • out-of-parameter emissions • unavailability of equipment, personnel or material.
Personal protective equipment	Personal Protective Equipment (PPE) requirements relate to the specified PPE for the task or job to be undertaken. PPE may include specific insulated boots, heat resistant material, full-ventilated suits, full-face masks or situation specific equipment.
Procedures	<p>Procedures may be written, verbal, computer-based or in some other form. They include:</p> <ul style="list-style-type: none"> • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. <p>For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (eg Responsible Care) and government regulations.</p>
Pre-start checks	Pre-start checks relate to the required site or equipment pre-start checklist and must be completed before the equipment is operated or as otherwise stated in the procedures.
Reports and records	<p>Reports and records may include:</p> <ul style="list-style-type: none"> • routine inspections (daily readings, monthly checks) • scheduled maintenance activities • computer readouts locally or in the control room • shift log sheet • mandatory or statutory inspections • hazard, accident and incident reports • quality inspection reports of the product.
Shutdown procedures	<p>Shut down procedure must follow equipment and site authorised checklist and may include</p> <ul style="list-style-type: none"> • communication to supply and delivery areas

RANGE STATEMENT	
	<ul style="list-style-type: none"> • communication to impacting areas • obtaining appropriate authorisations • rescheduling operations • liaison with maintenance teams.
Start up procedures	<p>Start up procedure will conform to site procedure and include:</p> <ul style="list-style-type: none"> • safety and pre-start checks • accessing shift logs and equipment records • pre-shift briefing information • records and reports from the previous shift.
Work requirements	<p>Work requirements includes shift briefings, shift logs supervisor or crew leader meetings, toolbox talks and handover details.</p>
Health, safety and environment (HSE)	<p>All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.</p> <p>Persons are required to have skills in hazard identification, assessment and application of control measures, eg spills and leaks identified, contained and cleaned up. Exposure to hazardous materials requires minimal personal contact, recognition of hazards and appropriate controls.</p>

Unit Sector(s)

Unit sector	Operational/technical
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Competency field

Competency field	
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Co-requisite units

Co-requisite units		
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