



Australian Government

MEM48018 Monitor primary steel making process

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM507A Monitor primary steelmaking process.

Application

This unit of competency defines the knowledge and skills required to monitor and control the operation of a basic oxygen steel making (BOS) furnace.

It applies where a technician will be required to utilise a Supervisory Control and Data Acquisition (SCADA) system to monitor the processing of melting steel scrap, charging of molten iron and associated materials within the BOS furnace and on completion, transfer to a ladle, ensuring that quantities, temperatures and all procedures are used in accordance with parameters provided and standard operating procedures (SOPs).

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

MEM48004 Interpret basic binary phase diagrams

MEM48011 Apply basic chemical principles to metallurgy

MEM48012 Calculate and predict chemical outcomes in metallurgical situations

Competency Field

Metallurgy

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs 1.4 Identify job requirements from work information

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
2. Access and use SCADA system	2.1 Find all relevant screens and information within SCADA system 2.2 Interpret and acknowledge messages 2.3 Input and output information according to work requirements
3. Make required changes	3.1 Adjust production and/or process in response to SCADA information in accordance with procedures 3.2 Apply metallurgical principles to determine and prioritise required actions in accordance with SOPs 3.3 Record adjustments and variations to specifications and/or schedules and report to appropriate personnel 3.4 Refer all events outside of parameters or SOPs to appropriate personnel for remedial action immediately

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

System Control and Data Acquisition (SCADA) system includes one or more of the following:	- field instrumentation - field controller (RTU or PLC) - human-machine interface (HMI) - network connectivity - data storage (on-site or cloud).
Metallurgical principles include:	- preparation and selection of raw materials - characteristics of iron ore - pelletising - sintering

	• iron blast furnace operations • blast furnace slags • principles of iron making • techniques for increasing blast furnace productivity.
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Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM507A Monitor primary steelmaking process.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM48018 Monitor primary steel making process

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, safety procedures and other reference material to monitor primary steel making process
- adjusting production and/or process in response to Supervisory Control and Data Acquisition (SCADA) information to meet specifications for furnace output on at least two occasions
- communicating within the workplace
- maintaining accurate records.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- plant layout of the basic oxygen steel making (BOS) furnace and identification of the processing units
- SCADA system
- process sequence of operations
- scrap charging, hot metal composition and charging and oxygen lancing
- slag formation, effect of slag and metal, gas emulsion and effect of stirring with inert gas
- chemistry and thermodynamics of process including sequence of impurity element removal
- influence of lance height, slagging practice including single or double number of re-blows and additions of coolant
- conditions for specification to end points of carbon and temperature including importance of elements C, Si, Mn, P, S, residual elements, oxygen content, temperature and type of steel

- conditions for final specification from end points including control of oxygen content, alloy additions and alloy recoveries, tapping of vessel, slag removal, selection of alloys, argon bubbling and temperature control of ladles
- ladle transfer
- metallurgical analysis in steel making
- importance of composition of steel properties
- effects of C, SI, MN, P, S and alloys including NI, CR, MO, NB, TI, V, PB
- effects of residual elements including CU, SN, AL, AS
- effects of gases in steels including N2, O2, H2.
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Assessment Conditions

- Assessors must:
 - have vocational competency in monitoring primary steel making process at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible, assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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