



Australian Government

Assessment Requirements for MEM48002 Monitor ferrous melting and casting processes

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM302A Monitor ferrous melting and casting processes.

Performance Evidence

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

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, safety procedures, codes of practice and/or standards for the required melting and casting processes
- calculating charges
- checking for contaminants when verifying metal changes to melting criteria on at least two occasions and recommending changes or additions to the charge
- performing visual checking of furnaces criteria on at least two occasions for operational condition and safety risks
- taking samples on at least two occasions for analysis in accordance with work health and safety (WHS) and quality procedures.

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)
- charge calculations including importance of composition control, methods used to calculate for additions and types of alloy additions
- steel including induction furnace melting (principles and refractories), arc furnace melting, acid, basic, single slag, double slag, deoxidisation and hydrogen control and ladle refining
- cast iron including types of cast iron, influence of carbon and silicon contents, carbon equivalent, effect of cooling rate, microstructure and classification of graphite, carbide stabilisers and graphite, inoculation and types of inoculants, spheroidal graphite formation and treatment methods and casting characteristics of grey, SG (ductile) and malleable cast irons

- ferrous alloys including definitions of iron and steel and their physical properties including density, tensile, hardness, melting points, shrinking percentage, casting temperature, SG (ductile) iron, carbon steel, grey and white irons, alloy cast irons, alloy steels, chilled and malleable iron
- selection including customer and manufacturer's requirements, metal analysis and Australian Standards
- types of furnaces and maintenance including blast furnace, cupola, induction, direct arc, indirect arc, open hearth, reverberatory and rotary
- refractories including dolomite, silica brick, chrome brick, ganister, fireclay, firebrick, magnesite, kyanite and fused alumina
- linings including monolithic, castable, rammable, bricks, basic, acid and neutral
- ladles including types (lip, tea pot and bottom pour), maintenance and safe working practices
- safety including housekeeping, PPE, dry area, pre-heating of ladles and overhead cranes
- furnace operation procedures including PPE, dry charging equipment, pre-heating, scrap selection, housekeeping, melting and alloying program, calculations including percentages and ratio, charge calculations and maintenance
- types of control equipment including carbon equivalent, wedge test, fluidity spiral test, chemical analysis, wet chemical analysis, spectrograph, sample spoons, sample moulds, deoxidising, degassing and temperature measurement
- quality control including accurate weighing, correct chemical analysis, temperature control, slag control (including chemistry and interaction with molten bath), alloying procedure, thermal analysis, degassing and deoxidising
- types of defects including contamination, gas absorption, metal analysis, temperature control and oxidation
- alloy production including charge analysis, charge calculation, charge preparation, melt control, tapping and pouring.

Assessment Conditions

- Assessors must:
 - have vocational competency in monitoring ferrous melting and casting processes 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.

Links

Companion Volume implementation guides are found in VETNet -

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