Australian Government

Assessment Requirements for MEM48020 Recommend ferrous and nonferrous metals or alloys for an application

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM509A Recommend ferrous and non ferrous metals or alloys for an application.

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 engineering requirements for the application from specifications, safety procedures and other reference material
- selecting appropriate metals to suit specific applications on at least two occasions
- applying basic metallurgical principles in preparing recommendations on at least two occasions
- applying and manipulating appropriate formulas for applications involving engineering calculations
- applying appropriate calculations to engineering and metallurgical situations
- preparing basic costs and estimates
- communicating within the workplace
- writing reports.

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)
- further processing
- unalloyed steels including:
  - iron-iron carbide phase diagram
  - phases in iron carbon alloys
  - slow cooling of steel and critical temperature lines
  - basis aspects of common heat treatment processes including full annealing, spheroidising stress relief annealing, process annealing, normalising, hardening and tempering
- alloy steels including:

- effect of alloying elements
- structural changes resulting from alloy additions including:
  - phase diagrams - Fe-C-Cr
  - effect of alloy additions on heat treatment, austenitising temperature, time and rate of transformation, hardening and tempering
- manganese steel
- stainless steels including:
  - classification
  - compositions, heat treatment, structure, properties and applications of stainless steels
  - austenitic
  - ferritic
  - duplex and super duplex ferritic-austenitic
  - martensitic
  - precipitation hardening
  - heat treatment problems including sensitisation and embrittlement
- cast irons including:
  - classification including structure, carbon distribution and form
  - factors affecting structure and properties including effect of carbon, silicon and cooling rate
- typical cast irons including compositions, method of manufacture, structures, properties and applications of:
  - grey cast irons
  - white cast irons
  - malleable cast irons
  - nodular (ductile) cast irons
  - alloy cast irons
  - austempered cast irons
  - compacted graphite irons
- copper alloys including:
  - commercial alloys from the following systems:
    - Cu-O, Cu-Be, Cu-Ni, Cu-Sn and Cu-Al
  - effects of casting, deformation, recrystallisation and ageing treatments on the structure and properties of the above alloys
- aluminium alloys including:
  - commercial alloys from the following systems:
    - Al-Si, Al-Cu, Al-Mg and Al-Mg-Si
  - relationship between structure and properties of the above alloys
- other alloys including:
  - zinc alloys
  - tin alloys

- nickel alloys
- cobalt alloys
- magnesium alloys
- titanium alloys.
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Assessment Conditions

- Assessors must:
  - have vocational competency in recommending ferrous and nonferrous metals or alloys for an application 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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Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2