



Australian Government

MEM48022 Apply metallurgical principles and practice to determine metal forming and shaping processes

Release: 1

MEM48022 Apply metallurgical principles and practice to determine metal forming and shaping processes

Modification History

Release 1. Supersedes and is equivalent to MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes.

Application

This unit of competency defines the skills and knowledge required to determine metal forming and shaping processes for an application as a member of a design and development team or similar in support of developing and selecting metal forming and shaping processes.

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

Pre-requisite Unit

Nil

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 Undertake consultations and briefings with managers, employers and customers to determine application requirements
2. Determine metal forming and shaping process to suit application requirements	2.1 Identify and research sources of information appropriate to metal forming and shaping 2.2 Select the relevant scientific techniques and principles of metal forming and shaping and associated software and hardware technologies 2.3 Use appropriate calculations and coherent units in the solution of engineering calculations

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.4 Use significant figures in engineering calculations 2.5 Determine metal forming and shaping requirements
3. Supervise metal forming and shaping processes	3.1 Communicate metal forming and shaping parameters to appropriate personnel 3.2 Supervise metal forming and shaping processes to ensure required solutions are achieved 3.3 Evaluate metal forming and shaping processes and advise on defects

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.

Sources of information include one or more of the following:	• reference standards and texts • manufacturers catalogues and industrial magazines • websites • phone information gathering • email information gathering.
Plastic deformation of metals include:	• revisions of the structural nature of plastic deformation of metals • hot and cold working and recrystallisation • revision of material on strength and ductility test parameters • yielding and associated phenomena • analysis of the complexes of stresses present in metal deformation.
Lubrication of metal surfaces include:	• types of lubrication • analysis of metal forming lubrication conditions • typical lubricants used.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes.

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 MEM48022 Apply metallurgical principles and practice to determine metal forming and shaping processes

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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
- undertaking consultations with relevant personnel and researching other sources of information including industry codes and standards in applying metallurgical principles and practice to determining metal forming and shaping processes appropriate to the application
- selecting scientific principles to suit applications
- selecting basic mechanical techniques and associated technologies, software and hardware to suit applications on at least two occasions
- applying and manipulating appropriate formulas for applications involving engineering calculations
- applying appropriate calculations to engineering situations
- referring solutions to the original aim of the application
- quoting solutions in appropriate units, using appropriate significant figures
- quoting limitations of solutions, due to assumptions, scientific principles and techniques used
- presenting and recommending solutions.

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
- sources of information
- metallurgical principles and practices
- plastic deformation of metals
- scientific principles, techniques and associated technologies, software and hardware to suit different applications

- lubrication of metal surfaces
- metal forming and shaping principles and methods, including:
 - physical and mechanical principles of the deformation process
 - industrial practices
 - equipment and process design
 - typical product defects
- advantages and disadvantages of:
 - rolling
 - forging
 - extrusion
 - wire drawing
 - tube manufacture
 - sheet metal forming, deep drawing and pressing
 - powder metallurgy.
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Assessment Conditions

- Assessors must:
 - have vocational competency in applying metallurgical principles and practice to determine metal forming and shaping 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.
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