



Australian Government

MEM48016 Select metal joining process

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MSATCM504A Select metal forming process.

Application

This unit of competency defines the knowledge and skills required to select the appropriate metal forming process for an application. It requires using metallurgical principles and techniques to select a process which is appropriate for the required product end use and the metal(s) to be used.

It applies to technicians who are required to recommend a metal forming process for making a metal product.

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

Pre-requisite Unit

MEM09229 Read and interpret technical engineering drawings

MEM30007 Select common engineering materials

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 Identify job requirements from specifications
2. Confirm requirements	2.1 Communicate with stakeholders regarding technical and aesthetic specification 2.2 Identify process constraints including timelines and cost

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	2.3 Identify any special requirements of product or process 2.4 Confirm product and process requirements with stakeholders
3. Shortlist possible forming processes	3.1 Identify forming processes to suit the application 3.2 Discuss suitability of different processes with stakeholders 3.3 Guide stakeholders to determine relative benefits of individual processes 3.4 Clarify conflicts of information and benefits that arise
4. Select metal forming process	4.1 Select the most appropriate process for the application 4.2 Explain reasons for selecting process to stakeholders 4.3 Clarify any unresolved areas

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.

Specifications include one or more of the following:	- drawings - job sheets - work instructions.
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Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM504A Select metal forming 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 MEM48016 Select metal joining 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 asking questions which lead stakeholders to describe the key factors and properties required
- communicating technical information both with technical and non-technical stakeholders who may be customers or managers and confirming requirements
- identifying and selecting appropriate process to suit the application on at least two occasions
- explaining rationale behind the selection process to stakeholders
- interpreting technical information
- writing technical reports and production specifications on at least two occasions
- interpreting numerical data.

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
- principles, strengths and weaknesses and typical applications of:
 - casting methods including greensand, chemically-bonded sand, horizontal part, vertical part, investment, gravity die, pressure die, centrifugal and direct cast
 - powder metallurgy including unidirectional die pressing, isotropic pressing, power rolling, power swaging, power extrusion, explosive compacting and sintering
 - electrometallurgy including chemical and mechanical pre-treatments, electroplating, cadmium plating, zinc plating, tin plating, copper plating, nickel plating, chromium plating and electro-polishing
 - methods of metalworking including plastic deformation, recrystallisation, recovery, grain growth, structural changes, property changes, direct compression, indirect compression, tensile, bending and shearing
 - direct compression processes including forging and rolling

- indirect compression processes including extrusion, wire drawing, tube drawing and deep drawing
- tensile processes including stretching
- bending processes including cold and hot bending
- cutting and shearing processes including turning, milling, grinding and shearing
- lubrication for metal forming processes including role of lubrication and types of lubricants
- metal forming risk factors including tool and die wear, metal fatigue, tool and product heating
- furnaces including melting furnaces, heating furnaces, energy sources, atmospheres and refractories
- isotropic and anisotropic materials including directional and non-directional plastic and fracture properties and texture
- questioning techniques that will lead stakeholders to describe the key factors and properties required
- economic and timeliness factors
- quality and aesthetics of finish
- technical differences including strength, rigidity, corrosion resistance, grain structure and chemical composition.
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Assessment Conditions

- Assessors must:
 - have vocational competency in selecting metal forming 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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