



Australian Government

Department of Education, Employment and Workplace Relations

MSATCM504A Select metal forming process

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This competency covers the selection of the appropriate metal forming processes 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.
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Application of the Unit

Application of the unit	This competency applies to technicians who are required to recommend a metal forming process for making a metal product. It includes: • knowing the principles of common forming processes and their typical applications • identifying the key factors in the product to be made which will guide the forming process selection • applying basic metallurgy to the situation so as to make an appropriate recommendation.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units	MEM09002B	Interpret technical drawing
	MSATCM501A	Calculate and predict chemical outcomes in metallurgical situations
	MEM30007A	Select common engineering materials

Pre-requisite	MEM09002B	Interpret technical drawing

Employability Skills Information

Employability Skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Confirm requirements	1.1. Communicate with stakeholders regarding technical and aesthetic specification 1.2. Identify process constraints such as timelines and cost 1.3. Identify any special requirements of product or process 1.4. Confirm product and process requirements with stakeholders.
2. Shortlist possible forming processes	2.1. Identify forming processes which may be appropriate. 2.2. Discuss suitability of different processes with stakeholders. 2.3. Guide stakeholders to determine relative benefits of individual processes 2.4. Clarify conflicts of information and benefits that arise.
3. Select metal forming process.	3.1. Select the most appropriate process for the application. 3.2. Explain reasons for selecting process to stakeholders. 3.3. Clarify any unresolved areas.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the essential skills and knowledge and their level, required for this unit.

Required skills:

- communicate technical information both with technical and non-technical stakeholders who may be customers or managers.
- write to the level of reading technical information and writing technical reports and production specifications.
- understand and interpret numeric data.

Required knowledge:

Competence in this unit requires knowledge of the 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, direct cast;
- Powder Metallurgy including unidirectional die pressing, isotropic pressing, power rolling, power swaging, power extrusion, explosive compacting, sintering;
- Electrometallurgy including chemical and mechanical pretreatments, electroplating, cadmium plating, zinc plating, tin plating, copper plating, nickel plating, chromium plating, electropolishing;
- Methods of metalworking including plastic deformation, recrystallisation, recovery, grain growth, structural changes, property changes, direct compression, indirect compression, tensile, bending, shearing;
- Direct compression processes including forging, rolling;
- Indirect compression processes including extrusion, wire drawing, tube drawing, deep drawing
- Tensile processes including stretching
- Bending processes including cold and hot bending
- Cutting and shearing processes including turning, milling, grinding, shearing,
- Lubrication for metal forming processes including role of lubrication, types of lubricants
- Metal forming risk factors including tool and die wear, metal fatigue, tool and product heating, (can we add some more?)
- Furnaces including melting furnaces, heating furnaces, energy sources, atmospheres, refractories
- Isotropic&anisotropic materials including directional and non-directional plastic and fracture properties, texture etc;

Competence also requires the ability to identify and ask questions which will lead stakeholders to describe the key factors and properties required.

Knowledge should also include economic and timeliness factors as well as quality, aesthetics of finish and technical differences such as strength, rigidity, corrosion resistance, grain

REQUIRED SKILLS AND KNOWLEDGE

structure, chemical composition etc.

Evidence Guide

EVIDENCE GUIDE

The Evidence Guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

Overview of assessment

This competency also requires evidence of competency in the selection of appropriate processes for various scenarios. The scenarios should be relevant to the application of metallurgy to the forming process and may be drawn directly from the workplace or may be simulated case studies.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

It is essential that competence is demonstrated in the ability to:

- select appropriate forming process
- justify the selection of that process
- ask appropriate questions to determine the required information.
- Consistent performance should be demonstrated. In particular look to see that:
- several scenarios requiring the selection of different processes have been completed successfully

Relationship to other units

This unit may be assessed concurrently with other relevant units.

Assessment method and context

Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the elements, performance criteria, skills and knowledge. A holistic approach should be taken to the assessment.

Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit.

The assessee will have access to all techniques, procedures, information, resources and aids which would normally be available in the workplace.

EVIDENCE GUIDE**Resource implications**

The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.

This section should be read in conjunction with the range of variables for this unit of competency. Resources required include suitable access to an operating plant or equipment that allows for appropriate and realistic simulation. A bank of case studies/scenarios and questions will also be required to the extent that they form part of the assessment method. Questioning may take place either in the workplace, or in an adjacent, quiet facility such as an office or lunchroom. No other special resources are required.

Range Statement**RANGE STATEMENT**

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Codes of practice/standards

Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.

Context

This competency applies to metallurgical technicians working in a foundry who may be required to make a recommendation of an appropriate forming process for a metal product. The appropriate process may, or may not be one conducted in a foundry.

Unit Sector(s)

Unit Sector	Metallurgy
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Competency field

Competency Field	
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Co-requisite units

Co-requisite Units		