



Australian Government

Department of Education, Employment and Workplace Relations

MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes

Release: 1

MSATCM511A Apply metallurgy principles and practice to determine metal forming and shaping processes

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	This unit covers using metallurgy skills and knowledge required to determine metal forming and shaping processes appropriate for an application.
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Application of the Unit

Application of the unit	This unit requires application of scientific principles and techniques as a member of a design and development team or similar in support developing and selecting metal forming and shaping processes.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Pre-requisite Units		

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. Determine appropriate metal forming and shaping process to suit application requirements	1.1. Consultations and briefings are undertaken with managers, employers and customers and other sources of information researched as appropriate to metal forming and shaping determine application requirements 1.2. The relevant scientific techniques and principles of metal forming and shaping and associated software and hardware technologies are selected for particular application 1.3. Appropriate calculations and coherent units are used in the solution of engineering calculations 1.4. Significant figures are used in engineering calculations. 1.5. Metal forming and shaping requirements are determined for particular application
2. Supervise metal forming and shaping processes	2.1. Metal forming and shaping parameters are communicated to appropriate personnel 2.2. Supervise metal forming and shaping processes to ensure required solutions are achieved 2.3. Evaluate metal forming and shaping processes and advise on defects

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills:

- select appropriate mechanical scientific principles to suit specific applications
- select appropriate basic mechanical techniques and associated technologies, software and hardware to suit specific applications
- apply scientific principles to metal forming
- apply and manipulating appropriate formulas for applications involving engineering calculations
- apply appropriate calculations to engineering situations
- refer solutions to the original aim of the application
- quote solutions in appropriate units, using appropriate significant figures.
- quote limitations of solutions, due to assumptions, scientific principles and techniques used
- present solutions referring to the original aim of the application

Required knowledge:

Competency includes sufficient knowledge of:

- metal forming and shaping principles as specified in the range statement
- limitations of selected scientific principles

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	A person who demonstrates competency in this unit must be able to apply metallurgy principles and practices. Critical aspects for assessment and evidence are required to demonstrate competency in this unit.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	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
Relationship to other units	This unit may be assessed concurrently with other relevant units.
Assessment method and context	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. The method of assessment should be discussed and agreed with the assessee prior to the commencement of assessment.
Resource implications	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	Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used.
Sources of information	• Reference texts • Manufacturers' catalogues and industrial magazines • Websites • Use of phone, email and fax information gathering
Scientific techniques and principles	Metal forming and shaping
Plastic deformation of metals	• 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	• Types of lubrication • Analysis of metal forming lubrication conditions • Typical lubricants used
Principles and methods of Rolling	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Forging	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Extrusion	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices

RANGE STATEMENT

	• equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Wire Drawing	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Tube Manufacture	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Sheet Metal forming, deep drawing and pressing	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.
Principles and methods of Powder metallurgy	Each of these topics should include knowledge of: • the physical and mechanical principles of the deformation process • industrial practices • equipment and process design; • typical products defects, advantages and disadvantages.

Unit Sector(s)

Unit Sector	Metallurgy
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Competency field

Competency Field	
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Co-requisite units

Co-requisite Units		