



Australian Government

MEM06009 Hand forge complex shapes

Release: 1

MEM06009 Hand forge complex shapes

Modification History

Release 1. Supersedes and is equivalent to MEM06009A Hand forge complex shapes

Application

This unit of competency defines the skills and knowledge required to produce intricate solid forged shapes commonly forged in the forging and fabrication areas of industry.

It covers hand forging of different metals, using specialised techniques, tools and jigs where specialised methods of holding, positioning and lifting complex forgings are required.

Where hand forging of simple shapes is required unit MEM06001 Perform hand forging should also be selected.

Where the interpretation of technical drawings is required unit MEM09002 Interpret technical drawing should also be selected.

Where the selection and use of engineering measurement is required unit MEM12023 Perform engineering measurements should also be selected.

Where the selection and use of tools is required unit MEM18001 Use hand tools and unit MEM18002 Use power tools/hand held operations, should also be selected as appropriate.

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

Band: A

Unit Weight: 4

Pre-requisite Unit

MEM06001	Perform hand forging
MEM11011	Undertake manual handling
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information

Competency Field

Forging

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, sketches, job sheets or work instructions
2	Forge complex shapes using hand tools on an anvil	2.1	Calculate material volume, making allowances for bending, material shrinkage and oxidation, as required
		2.2	Produce complex shapes using appropriate hand tools, procedures and techniques
		2.3	Check forging to ensure conformance to tolerances and specifications
3	Perform splitting and bundling on anvil	3.1	Select and use appropriate tools and equipment
		3.2	Apply hand forging techniques and procedures to forging and opening bundled and split sections making allowance for material shrinkage, distortion and oxidation
		3.3	Apply heat and control in specified areas of the material to be forged in accordance with SOPs
		3.4	Handle forgings in a safe and correct manner
		3.5	Check forgings to ensure conformance to tolerances and specifications
4	Produce jigs and tools for complex shapes	4.1	Select tools and equipment required to taper and bend materials appropriate to task requirements
		4.2	Apply techniques for producing jigs and tools to specifications

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 4.3 Bend and shape jigs and patterns to requirements
- 4.4 Forge hand held tools to the cut pattern in accordance with specifications
- 4.5 Perform final shaping, heat treatment and sharpening to specifications

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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, accessibility of the item, and local industry and regional contexts) are included.

Complex hand forging includes one (1) or more of the following:

- shaping
- reverse tapering
- jump up section for bends

Hand forging techniques include one (1) or more of the following:

- spreading
- surface chasing
- hot splitting

Equipment includes one (1) or more of the following:

- diesel
- electric and gas furnaces
- coke fires
- gaseous oxygen/fuel equipment

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM06009A Hand forge complex shapes

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 MEM06009 Hand forge complex shapes

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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 on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- selecting and using measuring guides
- calculating allowances for material volume, bending, shrinkage and oxidation
- selecting and using hand forging tools to forge complex shapes on anvil to meet specifications
- forging open and bundled split sections safely using heating equipment, as required, to meet specifications
- producing jigs and tools for complex shapes
- performing heat treatment processes for forgings.

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)
- forging hand tools and their applications
- techniques and procedures for hand forging complex shapes
- procedures for measuring forged articles and numerical operations and calculations/formulae for complex shapes
- forging temperatures and heat specifications for multiple pieces
- tools, techniques and equipment required to taper and bend materials
- effects of material shrinkage and oxidation on the dimensions of the forged article
- methods of overcoming/allowing for the effects of shrinkage and oxidation when hand forging articles
- procedures for handling forgings
- heating equipment and applications and appropriate heat treatment processes for forging different materials.

Assessment Conditions

- Assessors must:
 - have vocational competency in hand forging complex shapes 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. This must 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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