



Australian Government

MEM06015 Hand forge complex shapes

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Modification History

Release	Comments
1	This unit of competency was first released in MEM Manufacturing and Engineering Release 5.0.

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, MEM06001 Perform hand forging should also be selected.

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

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

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

Commonwealth and state/territory laws and regulations governing work and training environments must be complied with.

Band: A

Unit Weight: 4

Licensing/Regulatory Information

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

Pre-requisite unit(s)

MEM06010 Perform hand forging

MEM11011 Undertake manual handling

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

Competency field(s)

Forging

Unit sector(s)

N/A

Elements and Performance Criteria

Elements	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 and hand forming tools on an anvil	2.1 Calculate material volume, making allowances for bending, material shrinkage, and oxidation 2.2 Produce complex shapes using appropriate hand tools and hand forming tools, procedures, and techniques 2.3 Check forging to ensure conformance to tolerances and specifications
3. Perform splitting and bending on anvil	3.1 Select and use appropriate tools and equipment 3.2 Apply hand forging techniques and procedures for opening and bending split sections 3.3 Apply and control heat in specified areas of the material to be forged in accordance with SOPs 3.4 Handle forgings safely 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 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
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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.	
Hand tools include one or more of the following:	• cross pein hammer • straight pein hammer • ball tool • chasing tool • blacksmith T-square • heading tool.
Hand forming tools include one or more of the following:	• long flatter • side chisels (left and right hand) • gouge • round cutter • throat tool • swages • fullers.

Anvil tools include one or more of the following:	• hook tool and beak • anvil bridge and half-bridge • bending link • joggling block • angle bar tool • leaf spring setting tool • scroll jigs • anvil bolster.
Floor tools include one or more of the following:	• dishing blocks • wheel wright swage block • common swage block.
Hand forging techniques include one or more of the following:	• reverse tapering • opening and bending split sections • making jump-up section for bends • surface chasing • hot splitting • planishing.
Heating equipment includes one or more of the following:	• diesel equipment • electrical equipment • induction-forging equipment • gas equipment • solid-fuel equipment • oil-fuel equipment • ceramic-chip equipment • oxy-fuel equipment.

Unit Mapping Information

Current Code and Title	Previous Code and Title	Comments	Equivalence
MEM06015 Hand forge complex shapes	MEM06009 Hand forge complex shapes	Superseded	Equivalent

Assessment Requirements for MEM06015 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 and include the ability to:

- follow work instructions, standard operating procedures (SOPs) and safe work practices
- select and use measuring guides
- calculate material volume and allowances for bending, shrinkage and oxidation
- select and use hand forging tools to forge complex shapes on anvil to meet job requirements
- open and bend split sections using heating equipment to meet safety and job requirements
- produce jigs and tools for complex shapes
- perform heat treatment processes for forgings.

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 and use of personal protective equipment (PPE)
- forging hand tools and their applications
- techniques and procedures for hand forging complex shapes
- procedures for measuring lengths, weights and volumes of forged articles
- calculations and formulas for measurement of 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.

Link

Companion volumes, including implementation guides, are found on the national training register - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=45a7f1d5-61a5-447a-9688-7abbd7e1a5c7>.