



Australian Government

MEM23136A Evaluate stamping and forging tools

Release 1

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Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the evaluation of design features and functions of stamping and forging tools, and related processes. It includes cold piercing, punching, shearing, forming and drawing, and hot forging.

Application of the Unit

This unit applies to the evaluation of stamping or forging tools used in manufacturing and engineering applications.

It is suitable for people working as tool designers and maintenance technicians or paraprofessionals and draftspersons, and those pursuing manufacturing engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

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| MEM23004A | Apply technical mathematics |
| MEM23109A | Apply engineering mechanic principles |

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

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

Elements and Performance Criteria

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| 1 | Determine scope of stamping or forging tool evaluation | 1.1 | Determine parameters and context of stamping and forging tools in manufacturing operations |
| | | 1.2 | Confirm stakeholders to be consulted on evaluation |
| | | 1.3 | Confirm that appropriate support, including technical and professional assistance, is available |
| | | 1.4 | Identify relevant work health and safety (WHS) and regulatory requirements, standards, codes of practice, risk management and organisational procedures |
| 2 | Prepare for evaluation of forging or stamping tool | 2.1 | Identify principles and techniques required to evaluate and optimise stamping and forging tools |
| | | 2.2 | Select appropriate analysis techniques |
| | | 2.3 | Investigate sustainability implications of forging or stamping tooling |
| 3 | Evaluate stamping and forging tools and related manufacturing processes | 3.1 | Review design and construction features of functions of stamping and forging tools, and related manufacturing processes |
| | | 3.2 | Assess stamping and forging tools and related manufacturing processes for compliance with WHS and other regulatory and risk management requirements |
| | | 3.3 | Assess stamping and forging tools, products and processes for sustainability |

- 3.4 Assess suitability of stamping and forging tools for integration with quick changeover, preventative maintenance and other lean manufacturing-related techniques
 - 3.5 Review integration of stamping and forging tools with production management and control software
 - 3.6 Apply systems thinking, continuous improvement, problem solving and decision making, and constraint and contingency management principles and techniques to evaluation
 - 3.7 Review tooling in relation to product manufacturability and process maintainability
- 4 Report results
 - 4.1 Record results of evaluation
 - 4.2 Provide documentation, such as tool, product and process analysis, and computer-aided design (CAD) files

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Required skills include:

- determining type, role and performance requirements of stamping and forging tools in manufacturing processes
- reviewing stamping and forging tool design and construction, including tooling materials, treatment, finishing and assembly, tool installation and operation
- reviewing features and functions of stamping and forging tools in relation to products produced with the tool and any limitations of the tool in the related manufacturing processes
- selecting and using appropriate analysis techniques and software for evaluation and optimisation of moulding tools and related manufacturing processes
- identifying WHS, regulatory and risk management compliance
- investigating sustainability implications of stamping and forging tools and associated manufacturing processes
- assessing use of stamping and forging tools to:
 - lean manufacturing systems and techniques
 - requirements of manufacturing control software, such as system control and data acquisition (SCADA) software
- applying systems thinking, continuous improvement, and constraint and contingency management to evaluation of stamping and forging tools
- reporting and documenting scoping, principles and techniques identification and evaluation of tooling and related manufacturing processes, tooling graphics and models

Required knowledge

Required knowledge includes:

- hot and cold working and recrystallisation temperature
- functions and context of stamping and forging tools in manufacturing operations
- sources of technical and professional assistance
- WHS and regulatory compliance requirements and risk management practices for stamping and forging tools and related manufacturing and maintenance processes
- sustainability and lean systems implications for stamping and forging tools and related manufacturing processes
- stamping and forging processes, plant and tooling, including:
 - shearing
 - drawing

- impact deformation
- other forging processes
- forged component materials, including carbon, alloy and stainless steels, tool steel, copper, nickel, aluminium and titanium alloys
- stamping and forging tools general design features, functions and constraints, including:
 - shearing die design
 - deep drawing tool design
 - forging die tool design
- tool manufacture processes:
 - post-processing of CAD files
 - lathes, milling machines, grinding machines, jig borers and jig grinders
 - computer numeric control (CNC) machining
 - electro-discharge machining (EDM) and wire EDM
 - drilling and tapping
 - 'rapid' processes
 - heat treatment and surface treatments
 - finish grinding and polishing
- tool design and analysis software, including:
 - CAD software
 - analysis software, mould flows, heat dissipation and software validation techniques
- systems thinking, continuous improvement, problem solving and decision making, and constraint and contingency management principles and techniques
- reporting and documentation requirements

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

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| Overview of assessment | A person who demonstrates competency in this unit must be able to evaluate stamping and forging tools and processes for safety, economy and fitness for purpose. |
| Critical aspects for assessment and evidence required to demonstrate competency in this unit | <p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> • determine parameters and context of stamping and forging tools in manufacturing processes • review design and construction features, functions, applications and limitations of stamping and forging tools • identify principles, design, analysis techniques and software required to evaluate and optimise stamping and forging tools and related manufacturing processes • evaluate WHS, regulatory and risk management compliance • report and document results. |
| Context of and specific resources for assessment | <ul style="list-style-type: none"> • This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities. |
| Method of assessment | <ul style="list-style-type: none"> • Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with |

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| | <p>application of underpinning knowledge.</p> <ul style="list-style-type: none"> • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required. |
| Guidance information for assessment | Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed. |

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.

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| Features and functions, of stamping and forging tools | <p>Features and functions of stamping and forging tools include:</p> <ul style="list-style-type: none"> • materials used in their construction • method of manufacture • method of installation and any capacity for operator adjustment during use • method of adjustment for production changeover • the degree of training of operators required before use of the tool • any limitations on the use of the tool • cost of manufacture |
| WHS, regulatory requirements and enterprise procedures | <p>WHS, regulatory requirements and enterprise procedures may include:</p> <ul style="list-style-type: none"> • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and |

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| | <p>technical associations and societies</p> <ul style="list-style-type: none"> • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements |
| Standards and codes | Standards and codes refer to all relevant Australian and international standards and codes applicable to a particular task |
| Appropriate technical and professional assistance | <p>Appropriate technical and professional assistance may include:</p> <ul style="list-style-type: none"> • technical support and advice relating to elements which have intrinsic dangers, such as: <ul style="list-style-type: none"> • high pressure • energised fluid vessels • high temperatures and heat energy capacity • wiring with high current control voltages above extra low voltage • professional support for technologies, such as: <ul style="list-style-type: none"> • specialist electric motor drives and controllers • specialist materials, plastics, metal alloys and nano materials • special processes, foundry, alloy welding, heat treatment, sealing and fastening |
| Sustainability | <p>Sustainability is used to mean the entire sustainable performance of the organisation/plant, including:</p> <ul style="list-style-type: none"> • meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community minimising the negative WHS impact on employees, community and customer |
| Systems thinking | <p>Systems thinking refers to the conduct of engineering work in a manner that demonstrates knowledge of how the interaction of different technical systems on equipment, machinery or structures, as well as the skills and techniques of personnel, combine to perform or support engineering-related operations, processes or projects. It embraces determining or establishing how the function of each technical system or component, as well as the skills and techniques of personnel, effects or potentially may effect, outcomes. Systems should be interpreted broadly within the context of the organisation and depending on the project or operation can include equipment, related facilities, material,</p> |

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| | software, internal services and personnel, and other organisations in the value chain |
| Continuous improvement implementation | <p>Continuous improvement implementation may relate to plant, products, processes, systems or services, including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance.</p> <p>Improvement processes may include techniques, such as:</p> <ul style="list-style-type: none"> • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training |
| Constraints and contingencies | <p>Constraints and contingencies may be:</p> <ul style="list-style-type: none"> • financial • organisational, procedural or cultural • physical constraints, such as limits to resources, limits to site access or logistical limitations |
| Lean principles | <p>Lean principles affecting tooling and related processes include:</p> <ul style="list-style-type: none"> • tooling and processing costs • capacity and responsiveness to product demand • quality of product • reliability of tooling, process and supply • waste minimisation which includes ease of tool change |

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.