



Australian Government

MEM23135 Evaluate moulding tools and processes

Release: 1

MEM23135 Evaluate moulding tools and processes

Modification History

Release 1. Supersedes and is equivalent to MEM23135A Evaluate moulding tools and processes.

Application

This unit of competency defines the skills and knowledge required to evaluate design features and functions of moulding tools and related processes and includes injection moulds, blow, extrusion, compression, rotating, thermoforming and die casting moulds, and moulds for low volume components.

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

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine scope of moulding tool evaluation	1.1 Identify moulding tools used and related moulded products for evaluation 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	2.1 Identify principles and techniques required to evaluate and optimise

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
of moulding tools	moulding tools and related manufacturing processes 2.2 Select appropriate analysis techniques, software and software validation techniques 2.3 Investigate sustainability implications of mould tooling and related manufacturing processes
3. Evaluate moulding tools and related manufacturing processes	3.1 Review design and construction features and functions of moulding tools and related manufacturing processes 3.2 Assess moulding tools and related manufacturing processes for compliance with WHS and other regulatory and risk management requirements 3.3 Assess moulding tools, products and processes for sustainability 3.4 Assess suitability of moulding tools for integration with quick changeover, preventative maintenance and other lean manufacturing-related techniques 3.5 Review integration of moulding 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 including tool, product and process analysis, and computer-aided design (CAD) files

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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

Features and functions of moulding tools include:	• materials used in their construction • method of manufacture including welding and machining • dimensions and tolerances • 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 moulding tool • any limitations on the use of the moulding tool • cost of manufacture.
Injection moulded components include:	• all thermoplastics • some thermosets and elastomers • metal powders including low alloy and stainless steels, soft magnetic and controlled expansion alloys.
Enhanced injection and blow moulding tools and processes includes:	• multi-component and hard-soft injection moulding • microcellular foamed materials • powder injection moulding (PIM) and metal injection moulding (MIM) • gas or water assisted injection.
WHS, regulatory requirements and organisational procedures include:	• WHS acts, regulations and relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements.
Appropriate technical and professional assistance includes:	• technical support and advice relating to elements which have intrinsic dangers including • professional support for technologies.
Sustainability includes:	• 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.
Continuous improvement implementation includes one or more of the following techniques:	• 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 include one or more of the following:	• financial • organisational • procedural • cultural • physical (resource, access and logistical limitations).
Lean principles affecting tooling and related processes include:	• 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 Mapping Information

Release 1. Supersedes and is equivalent to MEM23135A Evaluate moulding tools and processes.

Links

Companion Volume Implementation Guides are available on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM23135 Evaluate moulding tools and processes

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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:

- determining parameters and context of moulding tools in manufacturing processes
- reviewing design and construction features, functions, applications and limitations of moulding tools on at least two occasions
- investigating sustainability implications of moulding tools and associated manufacturing processes
- identifying principles, design, analysis techniques and software including supervisory control and data acquisition (SCADA) required to evaluate and optimise moulding tools and related manufacturing processes
- evaluating work health and safety (WHS), regulatory and risk management compliance
- reporting and documenting results of evaluation.

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:

- design parameters, construction features, functions and context of moulding tools in manufacturing operations
- sources of technical and professional assistance
- WHS and regulatory compliance requirements, and risk management practices for moulding tools and related manufacturing and maintenance processes
- sustainability and lean systems implications for mould tooling and related manufacturing processes
- moulding processes that use tooling including:
 - injection moulding
 - blow moulding
 - extrusion moulding
 - compression moulding
 - rotational moulding
 - thermoform (vacuum) moulding

- die casting
- low volume and manual moulding
- moulding tool design features, functions and manufacturing techniques
- computer-aided design (CAD) design software and techniques including software for:
 - analysis
 - mould flows
 - heat dissipation
- injection moulded components
- injection moulds process including:
 - design features, functions and limitations
 - properties of materials for injection moulded components
 - enhanced injection moulding tools and processes
- blow moulds including continuous and intermittent parison extrusion moulding, injection and stretch blow moulds:
 - enhanced blow moulding tools and techniques
 - properties of blow moulding materials
- extrusion moulds including:
 - design features, functions and limitations
 - properties of extruded materials
- compression moulds including compression injection moulds:
 - design features functions and limitations
 - properties of materials for compression moulding
- rotating moulds including:
 - design features functions and limitations
 - properties of materials for rotating moulded components, including acetal copolymer (POM)
- thermoforming (vacuum) moulds including:
 - design features, functions and limitations
 - properties of materials for thermoformed components including amorphous thermoplastics and semicrystalline materials, with clearly defined melting points
- low volume moulds including flexible, laid up and sprayed shell moulds
- die casting moulds:
 - design features functions and limitations
 - properties of materials for hot chamber die cast components
 - properties of materials for cold chamber die cast components
- analysis techniques, software 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.
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Assessment Conditions

- Assessors must:
 - have vocational competency in evaluating moulding tools and processes 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 that 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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