



Australian Government

MEM234020 Coordinate small lot manufacture using rapid manufacture processes

Release: 1

MEM234020 Coordinate small lot manufacture using rapid manufacture processes

Modification History

Release 1. Supersedes and is equivalent to MEM234020A Coordinate small lot manufacture using rapid manufacture processes.

Application

This unit of competency defines the skills and knowledge required to coordinate rapid manufacture (RM), rapid prototyping (RP) and rapid tooling (RT) processes for single or small lot production and includes choice of materials, machinery and processes, plus generation of data and post-processing.

RM applications include products requiring a high degree of customisation and/or where speed to market is critical. Examples are medical and dental prosthetics and implants, customised components for automotive, aerospace, marine and general product manufacture, jewellery and other art objects or any small to medium quantity item, particularly involving high set-up cost associated with using alternative or traditional methods.

RP applications include concept modelling and multiple design iterations at low cost and form, fit and function testing prior to committing to expensive tooling. RT applications can include tooling for most RM components and both 'direct' and 'indirect' methods can be used to produce the tool.

It applies to the RM of components or prototypes across all forms of manufacturing and engineering and is suitable for manufacturing maintenance technicians, component and tool designers, and for those pursuing engineering or related qualifications and careers.

Individuals completing this work either already have or are developing skills and experience in the application of computer-aided design (CAD), computing technology, mathematics, scientific principles and techniques, materials, methods, processes and mechanical construction techniques.

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

Pre-requisite Unit

Nil

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. Clarify the production task and elaborate the specifications	1.1 Determine features of object to be produced 1.2 Determine parameters for the process and production and provide initial advice based on knowledge of rapid processes and current industrial design techniques 1.3 Assess work health and safety (WHS) and regulatory requirements, codes of practice, standards and risk management requirements 1.4 Confirm object parameters with client
2. Prepare software model and relevant data files for object	2.1 Check or create initial CAD model using appropriate modelling software 2.2 Select an appropriate rapid processing technology for object implementation 2.3 Ensure that CAD model data has been pre-processed and the required files have been created for given rapid processing equipment 2.4 Research and determine social and sustainability implications of solution
3. Finalise and direct production of first-off prototype	3.1 Finalise selected process, ensuring preparation of all required programming and documentation 3.2 Direct test run first-off sample 3.3 Obtain sign-off on sample by client 3.4 Direct production of batch quantity of objects, as required

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.	
WHS and regulatory requirements, codes of practice, standards and risk management requirements include:	• WHS acts, regulations and relevant standards • industry codes of practice • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements applying to electrical work.
Sustainability includes:	• the entire sustainable performance of the organisation and plant • 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.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM234020A Coordinate small lot manufacture using rapid manufacture 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 MEM234020 Coordinate small lot manufacture using rapid manufacture 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:

- interpreting features of object, materials, machinery and processes and parameters for rapid processes
- advising client based on discipline knowledge and work health and safety (WHS) and regulatory standards
- researching sustainability implications and current industrial design techniques
- determining WHS, regulatory and risk management requirements
- investigating, measuring and considering options
- modelling and calculating using appropriate software and validation techniques
- generating and evaluating solutions for feasibility against design criteria
- communicating, negotiating and reviewing with stakeholders and client throughout the process to obtain agreement on proposal and sign-off on design
- coordinating small lot manufacture on at least two occasions, producing a batch quantity of objects using rapid manufacture (RM) principles and processes
- documenting design with drawings, specifications and instructions.

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:

- technical and professional support services required to comply with ethical, licensing, legal and indemnity requirements
- economic, social and environmental implications of rapid processes
- WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements
- rapid manufacturing applications
- rapid prototyping applications
- factors affecting prototype material, machine and process selection

- current developments in machine and process capabilities for direct and indirectly manufactured components or tools
- machine data including:
- data digitising
- reverse engineering
- computer-aided devices and CAD files including:
 - CAD functions, features and techniques related to rapid prototyping (RP)
 - CAD model requirements for effective post-processing and suitability for the rapid process
 - file formats
 - post-processing
- current developments in materials including:
- materials for additive printing processes
- materials for sprayed metal deposition
- materials for rapid casting
- other materials including:
 - thermoplastics for vacuum forming
 - materials for rapid machining and fabrication
- required documentation, drawings, specifications, instructions, programming and processing information.
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Assessment Conditions

- Assessors must:
 - have vocational competency in coordinating small lot manufacture using rapid manufacture 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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