



Australian Government

MEM48024 Plan and complete metallurgical projects

Release: 1

MEM48024 Plan and complete metallurgical projects

Modification History

Release 1. Supersedes and is equivalent to MSATCM513A Plan and complete metallurgical projects.

Application

This unit of competency defines the skills and knowledge required to systematically plan, design and problem solve within a metallurgical context.

Planning, problem-solving and design should be implemented systematically within the context of market or customer requirements and the prevailing industrial environment in accordance with planning and design parameters including performance, financial, legal, resource and scheduling.

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

Pre-requisite Unit

MEM06003 Carry out heat treatment

MEM11011 Undertake manual handling

MEM13015 Work safely and effectively in manufacturing and engineering

MEM16006 Organise and communicate information

MEM16008 Interact with computing technology

MEM23063 Select and organise mechanical engineering material tests

MEM14089 Integrate mechanical fundamentals into an engineering task

MEM30007 Select common engineering materials

MEM30012 Apply mathematical techniques in a manufacturing engineering or related environment

MEM48004 Interpret basic binary phase diagrams

MEM48010 Determine and supervise heat treatment of metal

MEM48011 Apply basic chemical principles to metallurgy

MEM48012 Calculate and predict chemical outcomes in metallurgical situations

MEM48016 Select metal joining process

MEM48020 Recommend ferrous and nonferrous metals or alloys for an application

MEM48021 Apply metallurgical principles and techniques in welding and other thermal processes

Competency Field

Metallurgy

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 job requirements	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with work health and safety (WHS) requirements at all times 1.3 Interpret the client's requirements for a metallurgical application 1.4 Develop the project requirements and parameters with client 1.5 Research the context and parameters of the metallurgical project including the planning, design and problem-solving process 1.6 Prepare a report on the commercial and metallurgical context and parameters of the metallurgical project
2. Prepare concept proposal for metallurgical solution	2.1 Generate different approaches to achieve project objectives 2.2 Check feasibility of metallurgical solutions against project parameters 2.3 Assess metallurgical solutions for conformity to WHS and environmental requirements 2.4 Seek opinions of colleagues and technical experts from other disciplines 2.5 Prepare plan and concept proposal that includes results of feasibility study consideration including calculations and modelling 2.6 Review concept proposal with client to improve outcomes and overcome possible problems
3. Implement the planning, design or problem-solving process for metallurgical project	3.1 Select and manage resources and processes to develop the plan or design 3.2 Document management processes 3.3 Incorporate appropriate components and systems in the planning and design process 3.4 Use appropriate calculations and assumptions in implementing the planning and design process 3.5 Use appropriate computing hardware and software and programming techniques in the planning and design process 3.6 Apply appropriate metallurgical and other scientific, engineering and commercial principles and knowledge to implement planning and design process 3.7 Review concept proposal for metallurgical solution against planning

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	and design process in order to prepare firm metallurgical solution for client
4. Review metallurgical solution with client and prepare implementation plan	4.1 Review solution to ensure conformity with current specification, contract and organisational procedures, WHS and regulatory standards 4.2 Present and explain metallurgical solution and implementation plan to client including presentation of supporting documentation 4.3 Achieve and document client acceptance of the design and implementation plan
5. Implement metallurgical project	5.1 Complete all implementation documentation associated with project implementation in accordance with organisational and statutory requirements 5.2 Participate in implementation process and provide metallurgical oversight
6. Review metallurgical project outcomes	6.1 Review project outcomes in terms of the intended and actual outcomes 6.2 Prepare the report in accordance with organisational requirements

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.

Application of planning and design in metallurgy includes one or more of the following:	• conceptual development • management • design • manufacture
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	• implementation • commissioning and maintenance of products • processes • systems or services using metals and alloys in products • components in machines and systems for domestic, commercial, industrial, entertainment, civil, medical or military applications.
Parameters include one or more of the following:	• competitiveness • performance • financial, legal, resource and scheduling implications of a metallurgical application.
Reports include:	• a description of the metallurgical processes involved in the project • commercial, production and fabrication implications of different metallurgical options • occupational health, safety and environmental implications of metallurgical processes related to the project • preparation by a metallurgist working alone or in conjunction with engineers, technicians and other relevant personnel.
WHS and environment requirements include:	• ensuring that all organisational and statutory requirements are met • workforce is not exposed to hazardous worksite conditions, materials and processes • broader community is not exposed to environmental effects of the activity.
Implementation documentation that requires metallurgical input includes one or more of the following:	• Gantt charts • cost and other resource requirements • standard operating procedures (SOPs) and other instructions for organisation personnel • special safety and maintenance instructions • production schedules.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MSATCM513A Plan and complete metallurgical projects.

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 MEM48024 Plan and complete metallurgical projects

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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:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- researching and reporting context and parameters of the planning process for metallurgical applications
- planning and implementing a significant metallurgical application within a market and industrial context and in conformance with project parameters including financial, legal, resource and scheduling
- documenting and confirming an internal or external client's requirements in accordance with organisational procedures and practices
- informing the client of known work health and safety (WHS), regulatory, ethical, environmental, physical and cost limitations
- writing specifications to meet project requirements on at least two occasions
- documenting and agreeing on acceptance criteria with a client
- reviewing different approaches to technical feasibility, innovation and acceptance to client
- documenting possible metallurgical product or process concepts on at least two occasions
- analysing, comparing and contrasting the relative merits of possible metallurgical processes or products
- documenting an objective analysis of each approach
- discussing proposals with colleagues and specialists
- documenting concept proposal in accordance with organisational procedures
- establishing the planning and implementation team in accordance with organisational procedures
- identifying resources and establish management procedures
- selecting components and systems
- negotiating, documenting and monitoring outcomes and performance measures
- developing work instructions
- monitoring and correcting project progress
- performing risk analysis and corrective action
- evaluating assumptions and calculations for implementation of metallurgical processes
- preparing design diagrams and calculations

- applying metallurgical principles and knowledge in the implementation of the plan and design process
- selecting metallurgy-related materials
- selecting metallurgical methods and processes
- creating demonstration models
- confirming a metallurgical solution and plan on at least two occasions
- authorising modifications to the metallurgical specification in accordance with organisational procedures
- incorporating corrections and improvements to the design into the revised design solution and plan
- applying WHS and environmental requirements and regulatory standards
- completing documentation
- obtaining and reviewing feedback from the commissioning process
- monitoring the project outcomes or performance in the implementation environment on at least two occasions
- addressing deficiencies in project outcomes or performance as measured against specifications.

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)
- planning process for metallurgical applications
- market and industrial context and parameters of the planning and design process for a significant metallurgical application including financial, legal, resourcing and scheduling
- procedures for documenting and confirming client requirements
- codes, standards, specifications and legislative and regulatory requirements
- implications for sustainability and options for improved environmental outcomes
- constraints and risks associated with the development and implementation of metallurgical processes
- process of analysis, comparison and contrasting
- concept proposal review process
- metallurgical fundamentals affecting selection of components and systems
- metallurgy-related hardware and software
- properties of metal and alloys
- significance of the document control process
- procedures for initiating and gaining approval for changes to metallurgy-related processes
- metallurgy-related tests and testing schedules
- reasons for selecting tests and schedules
- corrective actions to return metallurgy-related processes to specification

- report requirements.
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Assessment Conditions

- Assessors must:
 - have vocational competency in planning and completing metallurgical projects 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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