Australian Government

MEM23111 Select electrical equipment and components for engineering applications

Release: 1

MEM23111 Select electrical equipment and components for engineering applications

Modification History

Release 1. Supersedes and is equivalent to MEM23111A Select electrical equipment and components for engineering applications.

Application

This unit of competency defines the skills and knowledge required to identify and match electrical supply and electrical system equipment and components to mechanical, manufacturing and mechatronic engineering applications. It includes electrical principles and laws, inductive and capacitive effects on alternating current (AC) supplies, control system power supply fundamentals, electrical safety and earthing systems, and electrical motors and motor controls.

It applies to people working as technicians in engineering or related fields where electrical power supply, equipment and systems must be considered and applies to mechanical, manufacturing and mechatronic engineering applications which include electrical equipment. This includes domestic, commercial or industrial situations. Electrical equipment and component identification covered by this unit is from manufacturer catalogues or other standard specifications. The unit does not cover one-off design or modification to electrical equipment.

The unit does not cover the undertaking of licensed electrical work but will often apply to individuals working as part of a team that includes licensed electricians.

This unit includes knowledge of electrical dangers and safety procedures and the need to comply with work health and safety (WHS) and electrical regulatory requirements.

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**
Elements describe the essential *outcomes.*	*Performance criteria describe the performance needed to demonstrate achievement of the element.*

Elements	Performance Criteria
Elements describe the essential *outcomes.*	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Investigate context of electrical equipment and supply	1.1 Review functions and features of devices 1.2 Identify safe machine 1.3 Identify WHS and regulatory requirements 1.4 Determine available sources for any required licensed electrical work 1.5 Review sustainability implications of energy source options
2. Determine electrical supply, equipment and components required for engineering-related tasks	2.1 Assess electrical supply specifications for engineering application 2.2 Analyse electrical motors and their control options for suitability 2.3 Estimate power factor requirements for engineering applications 2.4 Examine engineering application control and communication requirements 2.5 Appraise isolation, shutdown and emergency equipment options 2.6 Analyse maintenance, life cycle and sustainability requirements of electrical systems and equipment options 2.7 Apply specification, documentation and graphical techniques, modelling, mock-up or prototyping techniques, where required, to achieve or test options 2.8 Identify preferred electrical supply system, equipment and components
3. Report results	3.1 Record results of investigation, evaluation and application 3.2 Provide documentation including calculations, diagrams, programs and files in accordance with workplace procedures

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.	
Electrically powered equipment and systems include:	• motors • electrical supply equipment, including transformers, switchboards, and power circuit components • sensors, programmable logic controllers (PLCs) and control circuits • isolation, shutdown and emergency cut-offs • lighting • heating, cooling and ventilation • average and maximum load, power factor, switch board layout, earthing and protection systems and power consumption and cost.
Electrical-related engineering tasks include:	• determining WHS, regulatory and risk management requirements • evaluating electrical supply options • technical evaluation of options for electrical equipment and components against performance, cost and reliability requirements • determining methods for start, stop, speed control and reversing of electric motors • matching of electrical equipment to other systems.
Automation safety refers to use of general and specific safety features and includes:	• emergency stop • failsafe design • redundancy • interlocks • guarding data integrity • general plant design and use • functional safety of safety-related electrical, electronic and programmable electronic control systems.
Appropriate licensed technical and professional assistance include**:**	• technical support and advice relating to elements which have intrinsic dangers • professional support for technologies.
WHS, regulatory requirements and organisational procedures include:	• WHS acts and 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 applying to electrical work.
Life cycle assessment	• all aspects of manufacture of a single product

includes:	• the entire operations of an organisation • aspects of operations including environmental implications.
Sustainability implications include:	• 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 MEM23111A Select electrical equipment and components for engineering applications

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2