



Australian Government

MEM05051 Select welding processes

Release: 2

MEM05051 Select welding processes

Modification History

Release 2. Quantum of hours of workplace practice removed. Supersedes and is equivalent to MEM05051 Select welding processes (Release 1).

Release 1. Supersedes and is equivalent to MEM05051A Select welding processes.

Application

This unit of competency defines the skills and knowledge required to identify material properties and select appropriate welding processes that would typically conform to AS 1554 General Purpose and American Bureau of Shipping (ABS) or equivalent, to achieve safe and effective welding outcomes.

This unit applies to all types of welding and includes the identification of properties and characteristics of all commonly used metals, and selection of appropriate welding techniques to ensure integrity of materials is maintained during welding processes.

This unit can only be selected in conjunction with one or more of the following units:

- MEM05015 Weld using manual metal arc welding process
- MEM05017 Weld using gas metal arc welding process
- MEM05019 Weld using gas tungsten arc welding process
- MEM05023 Weld using submerged arc welding process
- MEM05047 Weld using flux core arc welding process
- MEM05055 Weld using oxy fuel gas welding process

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

Band: A

Unit Weight: 2

Pre-requisite Unit

MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information

Competency Field

Fabrication

Elements and Performance Criteria

Elements describe the essential outcomes.

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

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	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, job sheets or work instructions
2	Identify properties of commonly used metals	2.1	Identify materials to be welded
		2.2	Identify characteristics and properties of commonly used materials
		2.3	Identify uses and purposes of commonly used materials
		2.4	Consider basic metallurgical characteristics
3	Identify and provide for welding contingencies	3.1	Source Information relevant to welding processes, as required
		3.2	Identify potential contingencies and consider solutions
4	Identify appropriate welding process	4.1	Identify and select welding processes to achieve specified outcomes with selected metals
		4.2	Identify effects of welding processes on materials
		4.3	Identify distortion prevention measures
		4.4	Identify alternative joining methods for job and assess for relevancy
5	Identify cleaning	5.1	Identify processes for cleaning and preparing metals

Elements describe the essential outcomes.

and preparation requirements

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

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| 5.2 | Consider role of contaminants in welding flaws |
| 5.3 | Identify and utilise safety requirements for chemicals and other materials in accordance with manufacturers' specifications and legislative requirements |

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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.

Characteristics include the following:

- tensile strength, grade, heat resistance and density

Properties include the following:

- physical properties, flammable limits and melting point

Basic metallurgical characteristics include the following:

- alloys and grades of metals and different types of electrodes

Information includes one (1) or more of the following:

- steel suppliers' handbooks
- welding company materials
- SOPs
- safety documentation

Welding processes include one (1) or more of the following:

- fusion – electric arc welding, gas (oxy-fuel) welding and thermit welding
- pressure welding processes – resistance welding, fire or forge welding, friction welding and explosive welding
- low temperature processes – soldering and brazing

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.

- other – ultrasonic welding and electron beam welding

Effects include one (1) or more of the following:

- thermal expansion
- heat affected zones
- fume emissions
- altered density
- distortion

Distortion prevention measures include one (1) or more of the following:

- heat treatments
- consolidations

Processes for cleaning and weld preparation include one (1) or more of the following:

- etching
- grinding
- arc gouging
- thermal cutting
- chemical additives
- anti-corrosion treatments

Safety requirements include one (1) or more of the following:

- dry and ventilated areas
- in accordance with workplace procedures
- location away from heat risks
- location away from incompatible substances
- requirements for hazardous substances
- adequate signage and labelling
- appropriate sealing
- routine inspections
- emergency procedures
- regulatory notification requirements

Unit Mapping Information

Release 2. Supersedes and is equivalent to MEM05051 Select welding processes (Release 1).

Release 1. Supersedes and is equivalent to MEM05051A Select welding processes.

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 MEM05051 Select welding 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 on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying properties of common used metals
- identifying potential contingencies and considering solutions
- identifying and selecting appropriate welding process and the effects of the welding process on materials
- identifying processes for cleaning and preparing metals and the role of contaminants in welding flaws.

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 welding practices and procedures and use of personal protective equipment (PPE)
- properties and characteristics of commonly used metals and materials
- basic metallurgy principles associated with alloys and grades of metals
- uses and purposes of various metals
- distortion prevention measures for various metals
- different types of electrodes
- hazards associated with the use of chemicals and the fumes emitted by welding processes.

Assessment Conditions

- Assessors must:
 - have vocational competency in selecting welding 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.
- Assessment must occur in a functioning workplace. Where assessment in the workplace would be unsafe, impractical or threatens the environment, assessment must occur in a sufficiently rigorous simulated environment that reflects the circumstances that would be experienced in a functioning workplace. Assessment must cover all aspects of workplace performance, including 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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