



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM05023C Weld using submerged arc welding process**

**Release: 1**

## MEM05023C Weld using submerged arc welding process

### Modification History

Not Applicable

### Unit Descriptor

|                        |                                                                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Unit descriptor</b> | This unit covers preparing materials, selecting and setting up the welding equipment, carrying out the submerged arc welding, inspecting for and correcting defects, and maintaining weld records. |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Application of the Unit

|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <b>Application of the unit</b> | <p>Welds are more likely to be associated with heavy rather than with light fabrication. Welds include fillet and butt welds in all positions on a range of materials that may include carbon and stainless steel. The weld quality would meet the Australian Standard 1554 General Purpose or equivalent. The unit may satisfy the requirements of AS 1796 Certificate 9.</p> <p>Where welds comply with one of the certificates covered by Australian Standard 1796, then Unit MEM05026C (Apply welding principles) should also be selected.</p> <p><b>Band: A</b></p> <p><b>Unit Weight: 4</b></p> |
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### Licensing/Regulatory Information

Not Applicable

## Pre-Requisites

|                           |           |                                  |
|---------------------------|-----------|----------------------------------|
| <b>Prerequisite units</b> |           |                                  |
| <b>Path 1</b>             | MEM12023A | Perform engineering measurements |
|                           |           |                                  |

## Employability Skills Information

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|-----------------------------|------------------------------------------|
| <b>Employability skills</b> | This unit contains employability skills. |
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## Elements and Performance Criteria Pre-Content

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| Elements describe the essential outcomes of a unit of competency. | Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide. |
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## Elements and Performance Criteria

| ELEMENT                                               | PERFORMANCE CRITERIA                                                                                                                                                                                                                                             |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Prepare materials for welding                      | 1.1. Weld requirements are identified from specifications and/or drawings.<br>1.2. Material is correctly prepared using tools and techniques appropriate to the material and process.<br>1.3. Materials are assembled/aligned to specifications, where required. |
| 2. Select welding machine settings and consumables    | 2.1. Welding machine settings and consumables are identified from job requirements, welding procedures and specifications and/or technical drawings.                                                                                                             |
| 3. Assemble and set up welding equipment              | 3.1. Welding equipment is assembled and set up safely and correctly to standard operating procedures.<br>3.2. Test runs are undertaken and verified in accordance with specifications.                                                                           |
| 4. Identify distortion prevention methods             | 4.1. Distortion prevention measures are identified.<br>4.2. Action appropriate to the weld type and material is taken to minimise and rectify distortion.                                                                                                        |
| 5. Weld joints using submerged arc by correct process | 5.1. Pad, butt and fillet welds are deposited correctly in flat, and fillet welds in horizontal position, to specification.<br>5.2. Joints are cleaned to specifications using techniques and tools appropriate to the defect, material and process.             |
| 6. Inspect welds                                      | 6.1. Weld joints are visually inspected against specifications.<br>6.2. Weld defects are identified.                                                                                                                                                             |
| 7. Correct faults                                     | 7.1. Remedial action is taken, where required.<br>7.2. Defects are removed with minimum loss of sound metal using techniques and tools appropriate to the defect, material and process.                                                                          |
| 8. Maintain weld records as required                  | 8.1. Weld records are maintained to specifications and standard operating procedures.                                                                                                                                                                            |

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

**REQUIRED SKILLS AND KNOWLEDGE**

This section describes the skills and knowledge required for this unit.

**Required skills**

Look for evidence that confirms skills in:

- identifying and interpreting appropriate standard e.g. Australian Standard 1554 General Purpose, American Bureau of Shipping (ABS) or equivalent
- selecting and using appropriate tools and equipment
- using a variety of welding machines, wire electrodes, settings and materials
- identifying and rectifying weld defects
- applying techniques for distortion prevention and rectification
- cleaning weld
- maintaining weld records

**Required knowledge**

Look for evidence that confirms knowledge of:

- main types of fluxes and flux/wire combinations
- typical applications of SAW and common materials
- the application of weld metal transfer (short arc, spray, etc.)
- material preparation
- joint preparations
- electrode classification
- causes of distortion for materials within the scope of this unit
- causes of defects and methods of rectification
- code requirements
- safe welding practices
- use and application of personal protective equipment for submerged arc welding
- relevant hazards and control measures related to the competency

## Evidence Guide

| <b>EVIDENCE GUIDE</b>                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Overview of assessment</b></p>                                                                                                                                                                                          | <p>A person who demonstrates competency in this unit must be able to prepare materials, select and set up the welding equipment, carry out the submerged arc welding, visually inspect for and correct defects, and maintain the weld records. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>                                                                                                                    | <p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Context of and specific resources for assessment</b></p>                                                                                                                                                                | <p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate.</p> <p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with welding using submerged arc welding process or other units requiring the exercise of the skills and knowledge covered by this unit.</p> |
| <p><b>Method of assessment</b></p>                                                                                                                                                                                            | <p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes,</p>                                                                                                                                                                                                     |

| <b>EVIDENCE GUIDE</b>                      |                                             |
|--------------------------------------------|---------------------------------------------|
|                                            | standards, manuals and reference materials. |
| <b>Guidance information for assessment</b> |                                             |

## Range Statement

| <b>RANGE STATEMENT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                             |
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| <p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p> |                                                                                                                             |
| <b>Weld</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Fillet and butt in flat and horizontal positions                                                                            |
| <b>Prepared</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Preparation of materials including preheating, setting up of jigs, fixtures, clamps, etc., joint preparation e.g. bevelling |
| <b>Equipment</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | DC welding machines                                                                                                         |
| <b>Distortion prevention measures</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                | Distortion prevention including preheating, setting up of jigs, fixtures, clamps, etc.                                      |
| <b>Defects</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Porosity, slag inclusions, discontinuities, lack of penetration, undercut                                                   |
| <b>Remedial action</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Remedial action using thermal processes may include oxy acetylene and air arc equipment; grinding devices may also be used  |

## Unit Sector(s)

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|--------------------|--|
| <b>Unit sector</b> |  |
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## Co-requisite units

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| <b>Co-requisite units</b> |  |  |
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## Competency field

|                         |             |
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| <b>Competency field</b> | Fabrication |
|-------------------------|-------------|