MEM05051A Select welding processes

Modification History
Not Applicable

Unit Descriptor

| Unit descriptor | This unit covers identifying material properties and selecting appropriate welding processes to achieve safe and effective welding outcomes. |

Application of the Unit

<table>
<thead>
<tr>
<th>Application of the unit</th>
<th>This unit applies to all types of welding. It 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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band: A</td>
<td>Unit Weight: 2</td>
</tr>
</tbody>
</table>

Licensing/Regulatory Information
Not Applicable

Pre-Requisites

<table>
<thead>
<tr>
<th>Prerequisite units</th>
<th></th>
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</thead>
</table>
### Employability Skills Information

<table>
<thead>
<tr>
<th>Employability skills</th>
<th>This unit contains employability skills.</th>
</tr>
</thead>
</table>

### Elements and Performance Criteria Pre-Content

<table>
<thead>
<tr>
<th>Elements describe the essential outcomes of a unit of competency.</th>
<th>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.</th>
</tr>
</thead>
</table>
Elements and Performance Criteria

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 1. Identify properties of commonly used metals | 1.1. Materials to be welded are identified.  
1.2. Characteristics and properties of commonly used materials are identified.  
1.3. Uses and purposes of commonly used materials are identified.  
1.4. Basic metallurgical characteristics are considered. |
| 2. Identify and provide for welding contingencies | 2.1. Information relevant to welding processes is sourced as required.  
2.2. Potential contingencies are identified and solutions are considered. |
| 3. Identify appropriate welding processes | 3.1. Welding processes are identified and selected to achieve specified outcomes with selected metals.  
3.2. Effects of welding processes on materials are identified.  
3.3. Distortion prevention measures are identified.  
3.4. Alternative joining methods for job are identified and assessed for relevancy. |
| 4. Identify cleaning and preparation requirements | 4.1. Processes for cleaning and preparing metals are identified.  
4.2. Role of contaminants in welding flaws is explained.  
4.3. Safety requirements for chemicals and other materials are identified and utilised in accordance with manufacturers' specifications and legislative requirements. |

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:

- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
REQUIRED SKILLS AND KNOWLEDGE

- planning and sequencing operations
- checking and clarifying task-related information

**Required knowledge**

Look for evidence that confirms knowledge of:

- hazards and control measures associated with welding practices, including housekeeping
- safe work practices and procedures
- properties and characteristics of commonly used metals and materials
- basic metallurgy principles
- information resources
- chemical content of fumes emitted by welding processes
- uses and purposes of various metals
- distortion prevention measures for various metals
## Evidence Guide

**EVIDENCE GUIDE**

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.

<table>
<thead>
<tr>
<th>Overview of assessment</th>
<th>A person who demonstrates competency in this unit must be able to select welding processes.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical aspects for assessment and evidence required to demonstrate competency in this unit</td>
<td>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.</td>
</tr>
</tbody>
</table>
| Context of and specific resources for assessment | **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.**

This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with selecting welding processes or other units requiring the exercise of the skills and knowledge covered by this unit. |
| Method of assessment | 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, standards, manuals and reference materials. |
| Guidance information for assessment |  |
## Range Statement

**RANGE STATEMENT**

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.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Tensile strength, grade, heat resistance, density</th>
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</thead>
<tbody>
<tr>
<td>Properties</td>
<td>Physical properties, flammable limits, melting point</td>
</tr>
<tr>
<td>Basic metallurgical characteristics</td>
<td>Alloys and grades of metals and different types of electrodes</td>
</tr>
<tr>
<td>Information</td>
<td>Steel suppliers handbooks, welding company materials, standard operating procedures, safety documentation</td>
</tr>
</tbody>
</table>
| Welding processes | • Fusion:  
|                 |   • electric arc welding  
|                 |   • gas (oxy-fuel) welding  
|                 |   • thermit welding  
|                 | • Pressure welding processes:  
|                 |   • resistance welding  
|                 |   • fire or forge welding  
|                 |   • friction welding  
|                 |   • explosive welding  
|                 | • Low temperature processes:  
|                 |   • soldering  
|                 |   • brazing  
|                 | • Other:  
|                 |   • ultrasonic welding  
|                 |   • electron beam welding |
| Effects         | Thermal expansion, heat affected zones, fume emissions, altered density, distortion |
## RANGE STATEMENT

<table>
<thead>
<tr>
<th>Distortion prevention measures</th>
<th>Heat treatments, consolidations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processes for cleaning and weld preparation</td>
<td>Etching, grinding, arc gouging, thermal cutting, chemical additives, anti-corrosion treatments</td>
</tr>
</tbody>
</table>
| Safety requirements | • 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 Sector(s)

<table>
<thead>
<tr>
<th>Unit sector</th>
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## Co-requisite units

<table>
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## Competency field

| Competency field | Fabrication |