Australian Government

Department of Education, Employment and Workplace Relations

MEM05051A Select welding processes

Release: 1

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

Application of the unit	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. **Band**: **A** **Unit Weight**: **2**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
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.	
Overview of assessment	A person who demonstrates competency in this unit must be able to select welding processes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	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.
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.	
Characteristics	Tensile strength, grade, heat resistance, density
Properties	Physical properties, flammable limits, melting point
Basic metallurgical characteristics	Alloys and grades of metals and different types of electrodes
Information	Steel suppliers handbooks, welding company materials, standard operating procedures, safety documentation

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	
Distortion prevention measures	Heat treatments, consolidations
Processes for cleaning and weld preparation	Etching, grinding, arc gouging, thermal cutting, chemical additives, anti-corrosion treatments
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)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Fabrication