

Training Package	Metal and Engineering (MEM05)			HSC Requirements and Advice
Title	Perform routine manual metal arc welding			
Unit code	Competency field	Band	Unit weight	HSC Indicative Hours
MEM05012C	Fabrication	A	2	20

Unit descriptor	This unit covers preparing the materials and carrying out routine manual metal arc welding (MMAW).
Prerequisites	None
Application of the competency	This unit applies in a maintenance or manufacturing environment where the welding is not required to meet an Australian standard or equivalent. Fillet and butt welds would typically be performed on low carbon/mild steels.
Related units	Where welding is required to AS 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05015 (Weld using manual metal arc welding process) should be selected.

Evidence Guide

The evidence guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the unit descriptor, performance criteria, range statement and the assessment guidelines for the Metal and Engineering Training Package.

Overview of assessment requirements	Context of assessment	Interdependent assessment	Method of assessment
A person who demonstrates competency in this unit must be able to prepare materials and carry out routine manual metal arc welding (MMAW).	This unit may be assessed on the job, off the job or a combination of both. Where assessment occurs off the job, i.e. the candidate is not in productive work, then appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered 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 performing routine manual metal arc welding or other units requiring the exercise of the skills and knowledge covered by this unit.	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 should not require language, literacy and numeracy skills beyond those required in this unit. 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.

Evidence Guide cont/d			HSC Requirements and Advice
Consistency of performance	Required skills	Required knowledge	Key Terms and Concepts
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.	Look for evidence that confirms skills in: <ul style="list-style-type: none"> • preparing materials and electrodes • setting up welding equipment • welding with MMAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • performing measurements for joint preparation and routine MMAW. 	Look for evidence that confirms knowledge of: <ul style="list-style-type: none"> • material and equipment preparation • properties and characteristics of materials and consumables • weld characteristics • equipment set-up and settings • MMAW processes and properties • post-welding treatments • safe welding practices • use and application of personal protective equipment. 	<ul style="list-style-type: none"> • assembling, setting up and using tools and equipment • butt weld • characteristics of a good weld • clean and prepare materials • communication • consumable properties and characteristics • equipment settings • fillet weld • job instructions • joint specifications • manual metal arc welding (MMAW) techniques • material properties and characteristics • personal protective equipment (PPE) • post-weld treatments • preparatory requirements • protection of others • routine MMAW • safe work practices and procedures • standard operating procedures (SOP) • symbols and terminology • weld requirements • work instructions and procedures.

Elements	Performance criteria	Range Statement	HSC Requirements and Advice
1 Identify weld requirements	1.1 Weld requirements are identified from job instructions.	<p>The range statement provides information about the context in which the unit of competency is carried out. The variables [in bold] and scope [dot points] cater for different work requirements, work practices and knowledge between States, Territories and the Commonwealth, and between organisations and workplaces. The range statement relates to the unit as a whole and provides a focus for assessment. Text in italics in the performance criteria is explained here.</p> <p>The following variables may be present and <i>may include</i>, but are not limited to, the examples listed under the scope. All work is undertaken to relevant legislative requirements, where applicable.</p>	<p>Learning experiences for the HSC must address:</p> <p>A range of sources for work instructions and procedures including:</p> <ul style="list-style-type: none"> • work schedules • job card/sheet/plans/specifications • standard operating procedures (SOP) • standard operation sheets • Material Safety Data Sheets (MSDS) • diagrams/sketches • regulations/legislation • manufacturer/workplace guidelines, policies and procedures • Australian Standards • steel supplier's handbooks/representatives • welding company materials/representatives • seminars, field days and exhibitions. <p>An awareness of various modes of communication to receive work instructions including:</p> <ul style="list-style-type: none"> • verbal: <ul style="list-style-type: none"> - face to face (supervisor to employee) - telephone/mobile phone - workplace meetings • written communication: <ul style="list-style-type: none"> - work plans - memos/messages - job descriptions/statements - workplace forms - rosters • non verbal: <ul style="list-style-type: none"> - signage - diagrams. <p>Symbols and terminology commonly used in metal fabrication and welding.</p> <p>Safe work practices and procedures.</p>
	1.2 Location of welds is identified in accordance with standard operating procedures and job specifications.		

Elements	Performance criteria	Range Statement	HSC Requirements and Advice
2 Prepare materials for welding	2.1 <i>Materials</i> are cleaned and <i>prepared</i> ready for welding.	Materials <ul style="list-style-type: none"> • low and mild carbon steel or similar. Prepared <ul style="list-style-type: none"> • cleaning; setting up jigs, fixtures, clamps; joint preparation. 	Learning experiences for the HSC must address: Knowledge of: <ul style="list-style-type: none"> • the properties and characteristics of a range of materials • preparatory requirements <ul style="list-style-type: none"> - preparation of surfaces prior to welding - alignment, mounting and clamping materials - measurements for joint preparation - pre-heating of materials where required.
3 Prepare equipment for welding	3.1 <i>Welding equipment</i> is set up correctly.	Welding equipment <ul style="list-style-type: none"> • welding leads, welding machines, electrode holder etc. 	Learning experiences for the HSC must address: Safe work practices for using tools and equipment including: <ul style="list-style-type: none"> • following SOP and manufacturer’s specifications before, during and after use • risk management (identifying hazards and implementing control measures) • safe handling, application and storage of hazardous substances • appropriate use of personal protective equipment (PPE) • regular servicing and maintenance of tools and equipment • selection of appropriate equipment • adequate ventilation • awareness of occupational health and safety (OHS) issues in relation to welding. SOP for assembling, setting up and using a range of tools and equipment required for manual metal arc welding (MMAW).
	3.2 Correct electrodes are selected to suit application and settings.		Learning experiences for the HSC must address: Knowledge of: <ul style="list-style-type: none"> • the properties and characteristics of a range of consumables • equipment settings appropriate for the task.

Elements	Performance criteria	Range Statement	HSC Requirements and Advice
4 Perform routine welding using MMAW	4.1 Safe welding practices are applied.		<p>Learning experiences for the HSC must address:</p> <p>Use and application of a range of PPE including:</p> <ul style="list-style-type: none"> • footwear • head protection • gloves • protective clothing • respirator • face mask/shield • hearing protection • eye protection. <p>The importance of correct fitting PPE.</p> <p>An awareness of the importance of protecting others during welding processes.</p> <p>SOP and techniques for MMAW including:</p> <ul style="list-style-type: none"> • butt weld • fillet weld.
	4.2 Materials are welded to job requirements.		<p>Learning experiences for the HSC must address:</p> <p>Knowledge of:</p> <ul style="list-style-type: none"> • joint specifications • characteristics of a good weld.
	4.3 Welds are <i>cleaned</i> in accordance with standard operating procedures.	<p>Cleaning</p> <ul style="list-style-type: none"> • slag and splatter, cleaning, using files and grinders. 	<p>Learning experiences for the HSC must address:</p> <p>Knowledge of post-weld treatments.</p>