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| Training Package | Metal and Engineering (MEM05) | | | HSC Requirements and Advice |
| Title | Perform routine gas tungsten arc welding | | | |
| Unit code | Competency field | Band | Unit weight | HSC Indicative Hours |
| MEM05049B | Fabrication | A | 2 | 20 |

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| Unit descriptor | This unit covers preparing the materials and carrying out routine gas tungsten arc welding (GTAW). |
| Prerequisites | None |
| Application of the competency | This unit applies in a maintenance or manufacturing environment where the weld quality is not required to meet an Australian Standard. Fillet and butt welds would typically be performed on low carbon/mild steels and aluminium. |
| Related units | Where welding is required to meet Australian Standard 1554 General Purpose or equivalent codes, occupational health and safety regulations and/or licensing requirements, Unit MEM05019 (Weld using gas tungsten 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 |
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| A person who demonstrates competency in this unit must be able to perform routine gas tungsten arc welding (GTAW). | 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 preparing the materials and carrying out routine gas 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 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. |

| Evidence Guide cont/d | | | HSC Requirements and Advice |
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| 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 • setting up welding equipment • welding with GTAW • reading and interpreting routine information on written job instructions, specifications and standard operating procedures • using measurement skills for joint preparation and routine GTAW. | Look for evidence that confirms knowledge of: <ul style="list-style-type: none"> • preparatory requirements • properties and characteristics of materials and consumables • equipment and equipment settings • fuel gas properties and applications • post-welding treatments • weld characteristics • safe welding practices • use and application of personal protective equipment for routine GTAW. | <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 • gas tungsten arc welding (GTAW) techniques • job instructions • joint specifications • material properties and characteristics • personal protective equipment (PPE) • post-weld treatments • preparatory requirements • properties and application of fuel gases • protection of others • routine GTAW • 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 |
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| 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 The locations of welds are 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"> mild and low carbon steel. Prepared <ul style="list-style-type: none"> preheating; 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. | Equipment <ul style="list-style-type: none"> hoses, welding leads and gas shrouds, electrodes, gas regulators, liners, contact tips. | 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 gas tungsten arc welding (GTAW). |
| | 3.2 Settings and <i>consumables</i> are selected to suit application. | Consumables <ul style="list-style-type: none"> tungsten electrodes, filler wire, shielding gas. | Learning experiences for the HSC must address: Knowledge of: <ul style="list-style-type: none"> the properties, characteristics and application of a range of consumables, including fuel gases equipment settings appropriate for the task. |

| Elements | Performance criteria | Range Statement | HSC Requirements and Advice |
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| 4 Perform routine welding using GTAW | 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>Importance of correct fitting PPE.</p> <p>An awareness of the importance of protecting others during welding processes.</p> <p>SOP and techniques for GTAW 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> to standard operating procedures. | <p>Cleaned</p> <ul style="list-style-type: none"> • slag, spatter. | <p>Learning experiences for the HSC must address:</p> <p>Knowledge of post-weld treatments.</p> |