



Australian Government

Department of Education, Employment and Workplace Relations

MEM18006C Repair and fit engineering components

Release: 1

MEM18006C Repair and fit engineering components

Modification History

Not Applicable

Unit Descriptor

<p>Unit descriptor</p>	<p>This unit of competency covers mechanical repair and fitting trade skills including fault finding, repair of faulty components, manufacturing of new parts/components, and fitting mechanical engineering components into assemblies or sub-assemblies to specified measurements and tolerances and consistency with manufacturer's specification.</p> <p>Repair and fitting of engineering components is undertaken using mechanical engineering and maintenance principles, designated procedures, correct and appropriate tools/equipment, and safe working practices.</p>
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Application of the Unit

<p>Application of the unit</p>	<p>This unit of competency applies to repair and fitting work undertaken by a tradesperson in a mechanical maintenance, service or workshop environment. Work is undertaken autonomously or as part of a team using predetermined standards of quality, safety and workshop procedures. Skills covered include determining the need for repair or replacement of parts and assemblies, and undertaking of repair, replacement, assembly and final fitting of items, sub-assemblies and assemblies. All specifications are interpreted from engineering drawings, detailed/technical sketches and associated data sheets. The unit includes the use of appropriate workshop practices. New components are manufactured as required to specifications.</p> <p>This unit has been developed for Engineering Tradesperson - Mechanical apprenticeship training and the recognition of trade level skills in repair and fitting of engineering components. Skills covered by this unit are generally applied in occupational and work situations associated with trade level fitting and machining work. It may also apply to other mechanical trade occupational areas requiring high level repair and fit of engineering component skills.</p> <p>This unit has application in the MEM30205 Certificate III in Engineering - Mechanical qualification and other qualifications requiring a trade level of repair and fit skills.</p>
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	<p>This unit does not address machining competencies and welding, if these are required, the appropriate units should also be accessed. Where additional or higher marking out skills are required, refer to MEM12006C Mark off/out (general engineering). The knowledge and skills associated with the installation, removal, repair or replacement of mechanical seals is covered by MEM18012B Perform installation and removal of mechanical seals. For high pressure fluid power seals, refer to MEM18020B Maintain hydraulic system components.</p> <p>Band: A</p> <p>Unit Weight: 6</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18003C	Use tools for precision work
	MEM18055B	Dismantle, replace and assemble engineering components

Employability Skills Information

Employability skills	This unit contains employability skills.
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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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify scope of repair and/or fit required	1.1. Operational specifications for components are obtained from appropriate source and are interpreted and understood 1.2. Operation and condition of components are assessed against specifications 1.3. Faulty/worn components are identified 1.4. Causes of faults are determined using appropriate engineering principles, techniques, procedures, tools and equipment 1.5. Repair, replacement, adjustment or manufacture requirements are determined
2. Repair/replace faulty components	2.1. Where applicable, appropriate method of repair is determined 2.2. Where applicable, faulty components are repaired or adjusted to conform to specifications 2.3. Where applicable, replacement parts are selected from manufacturers' catalogues and assessed against specifications
3. Manufacture parts/components	3.1. Parts/component specifications are determined from appropriate source 3.2. Materials are selected to meet specification requirements 3.3. New components are produced in conformance to specifications using appropriate workshop practices 3.4. Completed components are inspected for compliance with dimensions 3.5. Where appropriate, component parts are marked for identification prior to assembly
4. Fit engineering components into assemblies or sub-assemblies	4.1. Fitting requirements and sequence of assembly are determined 4.2. Appropriate fitting principles and techniques are applied in the preparation and assembly of component parts using fastening equipment and methods which ensures conformance to specifications, operational performance, quality and safety 4.3. Using acceptable engineering practices, correct gland packing, jointing/gasket materials are selected and applied correctly in conformance to specifications and operational requirements

ELEMENT	PERFORMANCE CRITERIA
	<p>4.4. Correct lubrication requirements are determined by appropriate means and attended to where applicable</p> <p>4.5. Final adjustments are performed on component assembly to meet operational specifications using acceptable engineering principles, fitting techniques and procedures</p>
5. Check operation of repaired components/unit	<p>5.1. Components/unit are checked under operational conditions for compliance to operational specifications using acceptable engineering principles to standard operating procedures</p> <p>5.2. Out of specification modification/alterations are approved by appropriate authority and are recorded and documented to standard operating procedures</p> <p>5.3. Final component assembly is commissioned and returned to service according to standard operating procedures</p>

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- obtaining operational specifications for the components
- assessing operation against specification and identifying faults
- checking components visually and dimensionally against the operational specifications using work site procedures
- checking repaired components visually and dimensionally for conformance to specifications
- adjusting components to achieve conformance to specifications where appropriate
- selecting replacement parts which conform to specifications
- preparing and assembling components using appropriate fitting techniques and principles
- where appropriate, applying gland packing, jointing or gasket materials, using acceptable engineering practices
- applying appropriate lubricants to the assembly using acceptable engineering practices, where required

REQUIRED SKILLS AND KNOWLEDGE

- checking components for conformance to specification
- where required, adjusting components to achieve conformance to specifications
- where required, recording any approved modifications/alterations to work site procedures
- inspecting the final assembly and checking conformance to operational specifications
- where appropriate, returning the final assembly to service in accordance with work site procedures
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Required knowledge includes:

- tools and equipment to be used to dismantle the components
- consequences of having components that do not comply with operational specifications
- types of adjustment applicable to the components being repaired/fitted
- appropriate methods of repair
- features and/or dimensions upon which replacement parts are to be selected
- process of identifying replacement parts from third party suppliers' catalogues
- material properties required
- manufacturing operations to be used in the production of new components
- sequence of operations to be used in the production of new components
- fitting requirements for assembling components
- appropriate sequence of assembly tasks
- purpose of using gland packing, jointing or gasket materials
- reasons for selecting particular jointing or packing materials
- applications of different types of lubricants
- consequences of using inappropriate or no lubricant
- the need to have approval for out of specification modifications
- reasons for documenting out of specification modifications
- return to service procedures
- consequences of not following work site return to service procedures
- hazard and control measures associated with repairing and fitting engineering components, including housekeeping
- safe work practices and procedures

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 repair and fit engineering components to specifications in both workshop and site environments. Competency in this unit cannot be claimed until all prerequisites have been satisfied.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include:

- obtaining manufacturer's and enterprise specifications for equipment, materials and components
- checking components visually and dimensionally in the workplace including tolerances, allowances, clearances and limits
- repairing and fitting components and assemblies in a workshop environment to required specifications
- repairing and fitting components and assemblies in a production or other work site environment
- manufacturing and fitting components including commissioning and return to service checking of component and equipment through first off production or other recognised return to service checking procedure
- procedures for out of specification modification/alterations.

Context of and specific resources for assessment

This unit has been developed to support training in and recognition of trade level competency repair and fit of engineering components as applied to a trade level fitting and machining work environment. Assessment should emphasise a workplace context and procedures found in the candidate's workplace.

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.

EVIDENCE GUIDE	
Method of assessment	<p>Typically, persons engaged in Engineering Tradesperson - Mechanical work are required to apply their repair and fit skills and techniques across a range of jobs and specifications.</p> <p>A single assessment event is not appropriate. On the job assessment should be included as part of the assessment process wherever possible. Where assessment occurs off the job, judgement must consider evidence of the candidate's performance in a productive work environment that includes a sufficient range of appropriate tasks and materials to cover the scope of application for this unit.</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.</p> <p>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</p>
Guidance information for assessment	<p>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with repair and fit of engineering components or other units requiring the exercise of the skills and knowledge covered by this unit.</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>

Range Statement

RANGE STATEMENT

RANGE STATEMENT	
<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>	
Manufacturers' catalogues	Manufacturers' catalogues may include any appropriate manufacturers' catalogues that contain replacement parts that conform with specifications and operational requirements
Appropriate workshop practices	<p>Appropriate workshop practices may include:</p> <ul style="list-style-type: none"> • drilling • scraping • filing • reaming • tapping • threading
Fitting principles and techniques	<p>Fitting principles and techniques may include:</p> <ul style="list-style-type: none"> • limits of tolerance • allowances and clearances • effects of wear, stress, temperature • types of fits - clearance transition interference • press fitting methods • force fits • shrink and freeze (expansion) fits • keyed fits • taper fits • lateral and radial forces • backlash • configuration and mating of parts • applied use of precision tools and measuring equipment • engineering components - shafts, single and multi-throw crankshafts, cams and journals, bearings and bearing surfaces, keys • squareness, roundness, concentricity, flatness, straightness, surface finish and angular correctness • datum and centrelines

RANGE STATEMENT

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| | <ul style="list-style-type: none">tapping, reaming and broaching |
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Unit Sector(s)

Unit sector	
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Co-requisite units

Co-requisite units	

Competency field

Competency field	Maintenance and diagnostics
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