



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UEPMNT401B Install and maintain complex mechanical seals**

**Release: 1**

## **UEPMNT401B Install and maintain complex mechanical seals**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

#### **1) Scope:**

##### **1.1) Descriptor**

This unit deals with the skills and knowledge required to undertake all work associated with the installation and maintenance of complex mechanical seals and which may involve fault finding, diagnosis and repairs.

### **Application of the Unit**

#### **Application of the Unit    2)**

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

### **Licensing/Regulatory Information**

#### **License to practice        3)**

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

## Pre-Requisites

**Prerequisite Unit(s)** 4)

**Competencies** 4.1)

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Common Unit Group

| Unit Code  | Unit Title                                             |
|------------|--------------------------------------------------------|
| UEPMNT304B | Maintain Mechanical Pumps                              |
| MEM18006C  | Repair and fit engineering components                  |
| 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 |

**Literacy and numeracy skills** 4.2)

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

|         |   |         |   |          |   |
|---------|---|---------|---|----------|---|
| Reading | 4 | Writing | 4 | Numeracy | 4 |
|---------|---|---------|---|----------|---|

## Employability Skills Information

### Employability Skills 5)

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

## Elements and Performance Criteria Pre-Content

**6)** Elements describe the essential outcomes of a competency standard unit  
Performance Criteria describe the required performance needed to demonstrate achievement of the element.  
Assessment of performance is to be consistent with the Evidence Guide.

## Elements and Performance Criteria

| ELEMENT                         | PERFORMANCE CRITERIA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Plan and prepare for the work | <p>1.1 Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection</p> <p>1.2 Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturers' specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure</p> <p>1.3 Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications</p> <p>1.4 Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan</p> <p>1.5 Correct size, type and quantity of materials/components are determined, obtained and inspected for compliance with the job specifications</p> |

| ELEMENT                        | PERFORMANCE CRITERIA                                                                                                                                                                                           |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                | 1.6 Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements |
|                                | 1.7 Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work                                                        |
|                                | 1.8 Potential hazards are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures                                                                  |
|                                | 1.9 Work area is prepared in accordance with work requirements and site procedures                                                                                                                             |
|                                | 1.10 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of on-the-job training                                |
| 2 Remove seals for maintenance | 2.1 Required isolations are confirmed where appropriate, in accordance with site requirements                                                                                                                  |
|                                | 2.2 Seals are identified in accordance with the work plan                                                                                                                                                      |
|                                | 2.3 Seals are removed in a manner which will assist in replacement in accordance with the work plan                                                                                                            |
|                                | 2.4 Seals are inspected for abnormalities in accordance with the work plan                                                                                                                                     |
| 3 Maintain complex seals       | 3.1 Maintenance is performed in accordance with manufacturers specifications and site procedures                                                                                                               |
|                                | 3.2 Seal assemblies are dismantled using appropriate engineering principles and technical procedures in accordance with the job plan and site requirements                                                     |
|                                | 3.3 Component parts are clearly marked and sketches produced as required for identification in accordance with the job plan and site                                                                           |

| ELEMENT                         | PERFORMANCE CRITERIA                                                                                                                                                                    |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | requirements                                                                                                                                                                            |
|                                 | 3.4 Component wear and clearances are determined using precise measuring techniques and appropriate test equipment in accordance with manufacturer specifications and site requirements |
|                                 | 3.5 Components found to be faulty are repaired, replaced and/or adjusted to conform with manufacturer specifications and site requirements                                              |
|                                 | 3.6 New components are inspected for compliance to required specifications and prepared for reassembly according to manufacturer specifications /site requirements                      |
|                                 | 3.7 Component parts are refitted to seal assemblies according to manufacturer specifications /site requirements                                                                         |
|                                 | 3.8 Modifications/alterations are undertaken in accordance with site requirements                                                                                                       |
| 4 Replace/install complex seals | 4.1 Site is prepared for seal replacement in accordance with the work plan                                                                                                              |
|                                 | 4.2 Seals are replaced in accordance with the work plan and manufacturer specifications                                                                                                 |
|                                 | 4.3 All fastenings are torqued in accordance with manufacturer specifications and site requirements                                                                                     |
|                                 | 4.4 Machinery/plant is test run, monitored and adjusted as required in accordance with manufacturer specifications and site requirements                                                |
| 5 Complete the work             | 5.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements                                                                                |
|                                 | 5.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures                                                                          |

**ELEMENT****PERFORMANCE CRITERIA**

- 5.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures
- 5.4 Work completion details are finalised in accordance with site/enterprise procedures

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

**8)** This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired installing and maintaining complex mechanical seals.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

The extent of the Essential Knowledge and Associated Skills required follows:

KS01-PM 401B Complex mechanical seals

T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Introduction to and typical arrangements of power production plant
- Complex mechanical seals
- Precision measuring equipment
- Seals and gaskets (types and materials)
- Bearings (anti-friction and plain)
- Quality assurance/quality control
- Specialised tools and jigs
- Levelling and aligning principles
- Rigging and lifting techniques
- Relevant materials and components
- Hand and portable power tools
- Diagnostic and testing techniques
- Isolation procedures
- Heating techniques

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Identify and use measuring equipment
- Apply sealing principles
- Manufacture and install seals and gaskets
- Identify and select materials and components
- Use hand and portable power tools
- Apply diagnostic and testing techniques
- Apply dismantling and reassembling techniques

## REQUIRED SKILLS AND KNOWLEDGE

- Apply installation and maintenance procedures
- Recognise worn/damaged components
- Communicate effectively

## Evidence Guide

### EVIDENCE GUIDE

**9)** This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this competency standard unit and shall be used in conjunction with all components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

### Overview of Assessment 9.1)

Longitude competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and regulatory policy. Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment. Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be

more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included in the Assessment Guidelines of this Training Package.

**Critical aspects  
of evidence  
required to  
demonstrate  
competency in  
this unit** 9.2)

Before the critical aspects of evidence are considered all pre-requisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the “Assessment Guidelines – UEP12”. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
  - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
  - Demonstrate an appropriate level of employability skills
  - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
  - The knowledge and application of relevant sections of: Occupational Health and Safety legislation, statutory legislation, enterprise/site safety procedures and enterprise/site emergency procedures
  - Preparation and planning of work
  - Removal techniques; maintenance techniques and procedures

- Installation techniques and procedures
- Completion of work procedures
- Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

**Context of and specific resources for assessment**      **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

**Method of assessment**      **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note: Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

**Concurrent  
assessment and  
relationship with  
other units****9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

**Range Statement****RANGE STATEMENT**

**10)** This relates to the competency standard unit as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

Complex/specialised seals may include generator seals, double acting mechanical seals, floating seals and turbine labyrinth glands.

Test equipment may include feeler gauge, dial gauge, bearing blue, micrometers, flexi gauge, leads and go/no-go gauges.

Tools and equipment may include micrometers, verniers, dial test indicators, slip gauges, hand tools, customised mandrels, digital height gauges, internal micrometers, oxyacetylene gear, depth gauges, air grinders, jigs and fixtures, customised spanners, electronic internal micrometers, appropriate lifting devices, heated oil bath and induction heaters.

Details of maintenance may be clarified by diagnosis and work place inspection.

Maintenance may include repair, inspection, modification, overhaul, lubrication, servicing and test running.

Work completion details may include plant/maintenance records, job cards, check sheets, on device labelling updates and reporting/documenting equipment defects.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, dust, noise, gas and oil.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

**Unit Sector(s)**

Not applicable.

**Competency Field**

**Competency Field**            **11)**

Maintenance.