



**Australian Government**

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

# **UEPOPS332B Operate and monitor condensing and cooling systems**

**Release: 1**

## **UEPOPS332B Operate and monitor condensing and cooling systems**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

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

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

This unit deals with the skills and knowledge required to operate, inspect and monitor condenser cooling and auxiliary cooling systems.

### **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.

## 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.

There are no pre-requisite units.

**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 3      Writing 3      Numeracy 3

## 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 work  | 1.1 Safety issues are identified to comply with enterprise/site and legislative requirements                                                                                       |
|                          | 1.2 Work requirements are identified from relevant personnel and documentation                                                                                                     |
|                          | 1.3 Documentation to determine plant status is assessed and evaluate                                                                                                               |
|                          | 1.4 Localised plant inspection, pre-operational checks and field preparation for service are carried out in accordance with manufacturer and enterprise/site procedures            |
|                          | 1.5 Plant operational pre-requisites are established in accordance with manufacturer and enterprise/site procedures                                                                |
|                          | 1.6 Sequence for recommissioning of plant is determined to suit existing circumstances in accordance with enterprise/site requirements                                             |
|                          | 1.7 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training |
| 2 Operate plant          | 2.1 Plant is operated in accordance with enterprise and manufacturer operating procedures                                                                                          |
|                          | 2.2 Plant is monitored and observed to detect deviations from normal operating conditions                                                                                          |
|                          | 2.3 Corrective actions taken or reported, to rectify abnormalities are in accordance with industry standards and site requirements                                                 |
| 3 Test plant operational | 3.1 Tests are performed in accordance with defined procedures applicable to the operational test                                                                                   |
|                          | 3.2 Plant is observed for correct operational response                                                                                                                             |
|                          | 3.3 Corrective action is taken when response is not in accordance with documentation, plant                                                                                        |

| ELEMENT                     | PERFORMANCE CRITERIA                                                                                                                                                    |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | integrity or personnel safety requirements                                                                                                                              |
|                             | 3.4 Plant is returned to required operational status upon completion of test                                                                                            |
| 4 Analyse plant faults      | 4.1 Causes of abnormal plant operating conditions are identified by analysing the technical and operational information in a logical and sequential manner              |
|                             | 4.2 Corrective action taken is in accordance with enterprise/site procedures                                                                                            |
|                             | 4.3 Plant integrity and personnel safety is maintained through consultation with appropriate personnel, and reference to plant, technical and operational documentation |
| 5 Monitor and inspect plant | 5.1 Plant to be monitored/inspected is physically identified                                                                                                            |
|                             | 5.2 Plant is monitored/inspected for normal operation or to detect deviations                                                                                           |
|                             | 5.3 Corrective action taken is in accordance with enterprise/site procedures                                                                                            |
|                             | 5.4 Appropriate personnel are notified when defects are detected                                                                                                        |
| 6 Complete documentation    | 6.1 Documentation is updated and plant problems, movements, and abnormalities and status are reported and logged in accordance with enterprise/site 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 of operating and monitoring condensing and cooling water systems

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:

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

T1 Relevant Environmental, Occupational Health and Safety legislation and regulations

T2 Enterprise procedures

T3 Plant drawings and manufacturers manuals

T4 Introduction to and typical arrangements of power production plant

T5 Relevant plant and equipment, its location and operating parameters

T6 Electric motor types and characteristics

T7 Pump and compressor types and characteristics

T8 Valve, damper and actuator types and characteristics

T9 Switchgear types and characteristics

T10 Electrical protection types and characteristics

T11 Relevant state and territory regulations

T12 Plant status

T13 Enterprise recording procedures

T14 Control and data acquisition systems

T15 Condenser cooling system types and characteristics

T16 Condenser, types and characteristics

T17 Cooling towers, types and characteristics

T18 Air ejector, types and characteristics

T19 Condenser principles

T20 Thermodynamics

T21 Properties of matter

T22 Lubrication and bearings

T23 Feedwater and cooling water treatment

T24 Turbine construction and operating principles

T25 Electrical fundamentals

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Specific skills needed to achieve the Performance Criteria:

T1 Interpret plant drawings and manufacturers manuals

T2 Apply relevant state and territory regulations

T3 Identify plant status

T4 Prepare plant/equipment for operation

T5 Organise resources

T6 Operate condenser and auxiliary cooling water systems

T7 Apply diagnostic and testing techniques

## **REQUIRED SKILLS AND KNOWLEDGE**

T8 Identify and respond to abnormal plant operating conditions

T9 Plan and prioritise work

T10 Use relevant hand tools

T11 Communicate effectively

T12 Apply data analysis techniques and tools

## Evidence Guide

### EVIDENCE GUIDE

**9)** This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the 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, at a minimum, the application of the competency 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 in this regard.

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 practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors 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) Essential Knowledge and Associated Skills 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:
  - Knowledge and application of relevant sections of: Occupational Health and Safety legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures
  - Preparation and planning of work
  - Operation of condenser and cooling water systems
  - Operationally testing plant
  - Analysing plant faults
  - Monitoring plant operation
  - 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 Section 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 unit of competency 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.

Systems, plant and/or equipment may include electrical supply switchboards; condenser cooling water; auxiliary cooling water; treated water systems; chemical treatment systems; supervisory, alarm and control equipment; high and low pressure pump characteristics/operating conditions; valves, actuators and dampers (electric, hydraulic, pneumatic and manual); compressed air systems; filters; strainers; pressure control devices; heat exchangers; emergency water supply services; drum screens and cleaning systems; and condenser cleaning systems.

Safety standards may include relevant sections of Occupational Health and Safety legislation, enterprise safety rules, relevant state and federal legislation, national standards for plant and environmental legislation.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation; dedicated computer equipment; enterprise/site standing and operating instructions; enterprise log books; manufacturer operation and maintenance manuals; and equipment and alarm manuals. Technical and operational indicators may include stimuli (audio, smell, touch, visual), local indicators and recorders, computers and alarms (visible and or audible).

Communications may be by means of telephone, two way radio, pager, public address system, computer (electronic mail) and operating log (written or verbal).

Tests may include stand-by plant tests, post maintenance operating tests and test for water quality.

Appropriate personnel to consult, give or receive direction may include supervisor/team leader or equivalent, power plant operations personnel, technical and engineering officers or equivalent, maintenance staff, contractor and specialist personnel and power system control personnel or equivalent.

Test, fault finding and operating tools may include power or hand tools and control system equipment.

Operating environment may be during inclement or otherwise harsh weather conditions, in wet/noisy/dusty/hot areas, during night periods or during continuous operation.

Faults and abnormal operating conditions may include motor/pump/ actuator/valve/dampers failure/malfunctions, control equipment failure/ malfunctions, loss of electrical supply to plant and equipment, excessive vibration pumps/motors, high filter/strainer differential pressure, loss of major auxiliary, loss of control medium and water conductivity.

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)**  
Operations.