



**Australian Government**

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

# **UEPOPL002A Licence to operate a reciprocating steam engine**

**Release: 1**

## **UEPOPL002A Licence to operate a reciprocating steam engine**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

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

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

This unit specifies the outcomes required to operate a reciprocating steam engine for licensing purposes, which includes the operation of steam equipment where the steam acts upon a piston under pressure where this action of the steam forces the piston to move, including expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

### **Application of the Unit**

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

This unit requires the operator to plan the work, carry out pre-operational safety checks, start the reciprocating steam engine, monitor the reciprocating steam engine operation, carry out shut-down of reciprocating steam engine for operational and maintenance purposes.

This unit meets the requirements of state and territory Work Health and Safety (WHS) Regulations, including licensing. Any alteration will result in a unit which is not acceptable to regulators for the purpose of licensing.

### **Licensing/Regulatory Information**

Not applicable.

### **Pre-Requisites**

Not applicable.

## **Employability Skills Information**

### **Employability Skills      5)**

This unit contains Employability Skills.

## **Elements and Performance Criteria Pre-Content**

<b>6)</b> 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.
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## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1. Plan work	<p>1.1 Types of operations to be conducted for a reciprocating steam engine are assessed and prepared</p> <p>1.2 Personal protective equipment (PPE) is selected for use, ensuring statutory requirements and procedures are followed</p> <p>1.3 Hazards and potential hazards in work area are identified and assessed for risk, and controls recommended consistent with appropriate standards</p> <p>1.4 Pre-operational safety checks of reciprocating steam engine and equipment are conducted according to statutory requirements and procedures</p> <p>1.5 Maintenance requirements and equipment faults are identified and reported according to procedures</p> <p>1.6 Appropriate communication methods are identified according to procedures</p>
2. Start reciprocating steam engine	<p>2.1 Controls are implemented for identified hazards and potential hazards in work area consistent with appropriate standards</p> <p>2.2 Start-up checks are performed and the reciprocating steam engine is brought on line safely, according to statutory requirements and procedures</p> <p>2.3 Maintenance requirements are identified and reported according to procedures</p>
3. Monitor reciprocating steam engine operation	<p>3.1 Reciprocating steam engine is monitored according to statutory requirements and workplace procedures, including undertaking operational checks</p> <p>3.2 Operating log is maintained clearly and accurately, according to statutory requirements and procedures</p> <p>3.3 Information regarding reciprocating steam engine, its status and operation is communicated clearly according to procedures</p>
4. Shut-down reciprocating steam engine	<p>4.1 Engine is shut down according to statutory requirements and procedures, including shut down checks and shut down checks for maintenance</p> <p>4.2 Reciprocating steam engine is isolated according to procedures</p> <p>4.3 Maintenance requirements are identified, recorded and reported according to procedures</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

T1 Required skills:

- Accurate recording and maintenance of information relating to operation of a reciprocating steam engine
- Compliance with legislation, regulations, standards, codes of practice and established safe practices and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Diagnostic and testing techniques for reciprocating steam engines
- Efficient and safe conduct when starting, operating, shutting down and maintaining a reciprocating steam engine
- Use of appropriate communication techniques with colleagues and others
- Use of relevant tools and equipment
- Verification of problems and equipment faults and demonstrate appropriate response procedures

T2 Required knowledge:

- Basic principles of heat transfer and thermodynamics
- Commonwealth, state or territory WHS legislation, regulations, standards and codes of practice relevant to the full range of techniques for operating reciprocating steam engines
- Confined space awareness and the limits for entry into a confined space.
- Engine speed control equipment
- Environmental protection requirements relating to the disposal of waste material and storage of environmentally hazardous materials
- Established communication channels and protocols in the workplace
- Safety data sheets and material handling methods
- Organisational and workplace standards, requirements, policies and procedures for starting, operating, shutting down and maintaining a reciprocating steam engine
- Procedures for the recording, reporting and maintenance of workplace records and information
- Understanding of the hierarchy of hazard identification and control
- Reciprocating steam engine capabilities and components
- Reciprocating steam engine fault finding and problem solving techniques
- Reciprocating steam engine operations and operating techniques
- Reciprocating steam engine safety devices and testing techniques
- System components and their interaction with other plant and equipment
- Types of tools and equipment and procedures for their use, operation and maintenance
- Typical routine problems encountered in the process and with equipment and adjustments required for correction

## Evidence Guide

### EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for the Training Package.

#### **Overview of Assessment 9.1)**

Successful assessment of this unit meets the competency requirement of state and territory WHS Regulations, including licensing.

State/territory WHS regulators have mandated the use of Assessment Instruments and Instructions for Assessment for this unit which have been endorsed by the national body responsible for WHS matters.

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

Compliance with organisational and site policies and procedures including quality requirements and state or territory legislation applicable to workplace operations.

Compliance with WHS and environmental regulations, policies and procedures.

Effectively communicate and work safely with others in the work area.

Identify hazards associated with the operation of the reciprocating steam engine and put in place effective hazard controls for those hazards identified.

Effectively start-up, monitor and shutdown a reciprocating steam engine that meets the definition of this licence class.

Compliance with Commonwealth, state or territory regulations for the acquisition of a regulatory authority licence.

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

Assessment of the safe and effective application of knowledge and skill to workplace tasks (performance) must be undertaken using the endorsed Assessment Instrument.

Assessment of performance must be undertaken either in the workplace or in a realistically simulated workplace.

Assessors must ensure that the assessment in the workplace is organised to ensure that all the required equipment and materials and a suitable working area is made available to suit the assessment and the workplace.

Assessment must occur under standard and authorised work practices, safety requirements and environmental constraints. Assessment is to comply with relevant appropriate standard requirements.

- Applicants must have access to:
  - PPE for the purpose of the Performance Assessment
  - Appropriate safety equipment in safe condition
  - Appropriate reciprocating steam engine and associated equipment in safe condition
  - Communication equipment, where applicable.

**Method of assessment** 9.4)

Assessment must be conducted using the endorsed Assessment Instruments. These Instruments provide advice on their application.

The use of simulators in the assessment of this unit of competency is not acceptable.

Assessment may be in conjunction with the assessment of other units of competency.

Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.

Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstances, but is able to be transferred to other circumstances.

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

Further information about endorsed Assessment Instruments may be obtained from state and territory WHS regulators.



## Range Statement

### RANGE STATEMENT

**10)** 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.

Appropriate standards may include, but not be limited to: codes of Practice; legislation; Australian standards and manufacturers' specifications.

Communicated/Communication may include, but not be limited to: verbal; written; telephone; two-way radio; log records and computer record systems.

Emergencies may include, but not be limited to: fire; bomb threat; terrorism; personal accidents; chemical spills; major steam leaks; major water leaks and flooding and natural disasters.

Equipment may include, but not be limited to: engine and auxiliary plant; engine lubrication and power or control oil systems; hydraulic oil system; pump; compressed air system; steam supply system; cylinder exhaust system; computers with equipment control functions; supervisory, alarm, protection and control equipment and Relevant maintenance equipment.

Also to include equipment for: lock out for protecting operators and co-workers from accidental injury; emergency shutdown stopping; extinguishing fires; organisational first aid requirements and evacuation.

Equipment faults may include, but not be limited to: abnormal operating conditions; loss of a major auxiliary; excessively high engine and engine valves heating rates or differentials; high engine bearing temperatures or vibration; high pressure heaters malfunctions; mechanical or electrical faults or failure and failed field devices and engine protection.

Hazards may include, but not be limited to: chemical hazards; thermal hazards; manual handling hazards; guarding of machinery requirements; illumination of work area; rubbish and combustibles in area; leakage of steam; leakage of fuel; obstructions in the work area; fire; noise; vibration; water and working at heights.

Operational checks may include, but not be limited to: supply and quality of steam and line pressure; exhaust system; safety devices; speed governor; vibration level; lubrication system; operation and function of valves and fittings; cylinder drainage system and operation of control/safety devices.

Personal Protective Equipment (PPE) may include, but not be limited to: prescribed under legislation, regulation, codes of practice, and workplace policies and practices; hard hat; safety boots; gloves; high visibility clothing; breathing, hearing, sight, skin and sun protection; fall-arrest equipment such as harnesses and lanyards, horizontal life lines and inertia reel.

Pre-operational safety checks may include, but not be limited to: supply steam system; position and operation of engine valves; lubrication system; cylinder drainage system; exhaust system; auxiliary equipment; safety devices; over speed shut down; pressure relief devices and speed governor.

Procedures may include, but not be limited to: manufacturer's guidelines (instructions, specifications or checklists); industry operating procedures and workplace procedures (work instructions, operating procedures, checklists).

The operation of steam equipment where the steam acts upon a piston under pressure

## **RANGE STATEMENT**

where this action of the steam forces the piston to move. The definition includes all expanding (steam) reciprocating engines, with any piston diameter of greater than 250 millimetres.

Recorded may include, but not be limited to: operations and maintenance of reciprocating steam engine equipment; difficulties or issues; environmental issues; recommendations for future work; results; costs; hazards; incidents or injuries; dangerous occurrences or equipment; malfunctions using log books; proformas; production reports and maintenance records

Shut down checks may include, but not be limited to: steam supply; cooling process; load on engine; cylinder drains and auxiliary equipment.

Shut down checks for maintenance may include, but not be limited to: checks of cooling down process; isolation of steam; isolation from any common connection and opening of all access points required for inspection.

A simulator is a device used especially in training to reproduce the conditions of the working situation, enabling tasks to be learned and practised safely and economically.

Start-up checks May include, but not be limited to: heat input; steam supply system; steam traps and steam line purge systems operation; engine warmed up; lubrication system; drainage system; operation and position of engine valves and fittings; operation of auxiliary equipment; freedom of rotation of engine; warm up of reticulation system and reticulation line pressure.

Testing May include, but not be limited to: loss of a major auxiliary controls response checks; stand-by plant “cut-in” tests; valves operating checks; on-load engine valve and emergency governor operation test; performance tests; valve operation tests and alarm and protection tests.

## **Unit Sector(s)**

Not applicable.

## **Competency Field**

Not applicable.