



Australian Government

UEPOPL002 Licence to operate a reciprocating steam engine

Release: 1

UEPOPL002 Licence to operate a reciprocating steam engine

Modification History

Release 1. This is the first release of this unit of competency in the UEP Generation Training Package.

Application

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.

Reciprocating steam engine means equipment that is driven by steam acting on a piston causing the piston to move and includes and expanding (steam) reciprocating engine.

High risk work is classed as the operation of a reciprocating steam engine where the diameter of any piston exceeds 250 millimetres.

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.

A person performing this work is required to hold a reciprocating steam engine operation high risk work (HRW) licence.

Licensing/Regulatory information

This unit is based on the licensing requirements of Part 4.5 of the Model Work Health and Safety (WHS) Regulations, HRW and meets Commonwealth, state and territory HRW licensing requirements.

Any alteration to this unit would result in a unit that would not be acceptable to Work, Health and Safety (WHS)/Occupational Health and Safety (OHS) regulators for the purpose of licensing.

Pre-requisite Unit

There are no prerequisite units.

Competency Field

Licensing There are no prerequisite units.

Unit Sector

Electricity generation

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan work

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1 Types of operations to be conducted for a reciprocating steam engine are assessed and prepared
- 1.2 Personal Protective Equipment (PPE) is selected for use, ensuring statutory requirements and procedures are followed
- 1.3 Hazards and potential hazards in work area are identified and assessed for risk and controls recommended are consistent with appropriate standards
- 1.4 Pre-operational safety checks of reciprocating steam engine and equipment are conducted, in accordance with statutory requirements and procedures
- 1.5 Maintenance requirements and equipment faults are identified and reported, in accordance with procedures
- 1.6 Communication methods are identified according to procedures

2 Start reciprocating steam engine

- 2.1 Controls are implemented for hazards in work area consistent with industry standards
- 2.2 Start-up checks are performed and the reciprocating steam engine is brought on line safely, in accordance with statutory requirements and procedures
- 2.3 Maintenance requirements are identified and reported, in accordance with procedures

3 Monitor reciprocating steam engine operation

- 3.1 Reciprocating steam engine is monitored, in accordance with statutory requirements and workplace procedures, including undertaking operational checks
- 3.2 Operating log is maintained clearly and accurately, in accordance with statutory requirements and procedures
- 3.3 Information regarding reciprocating steam engine, its status and operation is communicated clearly in accordance with procedures

4 Shut down reciprocating steam engine

- 4.1** Engine is shut down in accordance with statutory requirements and procedures, including shut down checks and shut down checks for maintenance
- 4.2** Reciprocating steam engine is isolated in accordance with procedures
- 4.3** Maintenance requirements are identified, recorded and reported in accordance with procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Companion Volume Implementation Guide.

appropriate standards must include

but not be limited to:

- codes of practice
- legislation
- Australian Standards
- manufacturers' specifications

communicated and/or communication must include

but are be limited to:

- verbal
- written
- telephone
- two-way radio
- log records
- computer record systems

emergencies must include

but not be limited to:

- fire
- bomb threat
- terrorism
- personal accidents
- chemical spills
- major steam leaks
- major water leaks

equipment must include

- flooding
- natural disasters

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
- relevant maintenance equipment

including equipment for:

- lock out for protecting operators and co-workers from accidental injury
- emergency shutdown stopping
- extinguishing fires
- organisational first aid requirements
- evacuation

equipment faults must 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 heater malfunctions
- mechanical or electrical faults or failure
- failed field devices
- engine protection

hazards must 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

operational checks must include

- leakage of steam
- leakage of fuel
- obstructions in work area
- fire
- noise
- vibration
- water
- working at heights

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
- operation of control and/or safety devices

Personal Protective Equipment (PPE) must include

but not be limited to:

- prescribed under legislation, regulation and codes of practice
- 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

preoperational 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

procedures must include	• speed governor but not be limited to:
operation of steam equipment must include	• manufacturers' guidelines (e.g. instructions, specifications or checklists) • industry operating procedures • workplace procedures (e.g. work instructions, operating procedures and checklists) • where the steam acts upon a piston under pressure 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 must 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 • maintenance records
shutdown checks must include	but not be limited to: • steam supply • cooling process • load on engine • cylinder drains • auxiliary equipment
shutdown checks for maintenance must include	but not be limited to: • checks of cooling down process • isolation of steam • isolation from any common connection • opening of all access points required for

a simulator must include	inspection • 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 must 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 • reticulation line pressure
testing must include	but not be limited to: • loss of a major auxiliary controls response checks • standby plant cut-in tests • valves operating checks • on load engine valve and emergency governor operation test • performance tests • valve operation tests • alarm and protection tests

Unit Mapping Information

This unit replaces and is equivalent to UEPOPL002A Licence to operate a reciprocating steam engine.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=1715b9fa-e7bd-441c-bb8d-cf22c9c825a8>

Assessment Requirements for UEPOPL002 Licence to operate a reciprocating steam engine

Modification History

Release 1. This is the first release of this unit of competency in the UEP Generation Training Package.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements, performance criteria and range of conditions on at least one occasion and includes:

- communicating effectively and working safely with others in the work area
- completing verification of problems and equipment faults and demonstrate appropriate response procedures
- compliance with Commonwealth, state or territory regulations for the acquisition of a high risk work licence for reciprocating steam engine operation
- 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
- 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
- identifying hazards associated with the operation of the reciprocating steam engine and put in place effective hazard controls for those hazards identified
- performing efficiently and safely when starting, operating, shutting down and maintaining a reciprocating steam engine
- recording accurately and maintaining information relating to operation of a reciprocating steam engine
- starting up, monitoring and shutting down a reciprocating steam engine effectively that meets the definition of this licence class
- undertaking diagnostic and testing techniques for reciprocating steam engines
- using appropriate communication techniques with colleagues and others
- utilising relevant tools and equipment

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all the requirements of the elements, performance criteria and range of conditions and includes knowledge of:

- 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
- hierarchy of hazard identification and control
- 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
- 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
- routine problems encountered in the process and with equipment and adjustments required for correction
- safety data sheets and material handling methods
- system components and their interaction with other plant and equipment
- types of tools and equipment and procedures for use, operation and maintenance

Assessment Conditions

Assessments must be conducted by an assessor accredited for this High Risk Work (HRW) licence class in the Commonwealth, state or territory where the licence will be obtained (i.e. an assessor authorised by a Commonwealth, state or territory WHS/OHS regulator).

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

As a minimum, assessment must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment of performance must be undertaken in the workplace and/or under realistic workplace conditions which typically reflect:

- performing tasks and activities within timelines that would be expected in a workplace
- standard and authorised work practices, safety requirements and environmental constraints
- using full scale equipment

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

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools and equipment and currently used in industry including:
 - Personal Protective Equipment (PPE) for performance assessment
 - appropriate safety equipment in safe condition
 - appropriate reciprocating steam engine and associated equipment in safe condition
- communication equipment, as required applicable documentation including workplace procedures, industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

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