



Australian Government

UEPOPL002 Licence to operate a reciprocating steam engine

Release: 1

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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

2 Start reciprocating steam engine

3 Monitor reciprocating steam engine operation

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
- 2.1 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
- 3.1 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

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

operational checks must 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
- 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:

- manufacturers' guidelines (e.g. instructions, specifications or checklists)
- industry operating procedures
- workplace procedures (e.g. work instructions, operating procedures and checklists)

operation of steam equipment must include

- 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.education.gov.au/Pages/TrainingDocs.aspx?q=1715b9fa-e7bd-441c-bb8d-cf22c9c825a8>