



Australian Government

UEENEEG116A Diagnose and rectify faults in traction lift systems

Release 2

UEENEEG116A Diagnose and rectify faults in traction lift systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers diagnosing and rectifying faults in traction lift systems and equipment. It encompasses working safely, replacing and/or adjustment of lift circuit and associated components, diagnosing and repairing of faults in lift circuits and associated components (including governors, brakes, safety gear, safety devices, lift machines, door components and controllers) and releasing passengers from lifts which have become immobilised.

Application of the Unit

Application of the Unit 2)

This unit applies to any formal recognition for this standard at the aligned AQF 3 level or higher.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of

License to practice**3)**

training such as apprenticeships.

Pre-Requisites**Prerequisite Unit(s)****4)****Competencies****4.1)**

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

UEENEEE101 A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102 A	Fabricate, dismantle, assemble of utilities components
UEENEEE104 A	Solve problems in d.c circuits
UEENEEE105 A	Fix and secure electrotechnology equipment
UEENEEE107 A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG006 A	Solve problems in single and three phase low voltage machines
UEENEEG033 A	Solve problems in single and three phase electrical apparatus and circuits
UEENEEG063 A	Arrange circuits, control and protection for general electrical installations
UEENEEG101 A	Solve problems in electromagnetic devices and related circuits
UEENEEG102 A	Solve problems in low voltage a.c. circuit
UEENEEG106 A	Terminate cables, cords and accessories for low voltage circuits

Prerequisite Unit(s) 4)

UEENEEG108 A Troubleshoot and repair faults in low voltage electrical apparatus and circuits

Literacy and numeracy skills 4.2)

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 5

Employability Skills Information**Employability Skills 5)**

This unit contains Employability Skills

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 Prepare to diagnose and rectify faults.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 OHS risk control measures and procedures in preparation for the work are followed.
	1.3 The likely extent of work to be undertaken is envisaged from maintain procedures or fault/breakdown reports and/or discussions with appropriate person(s).
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Tools, equipment and testing devices needed to carry out the work are obtained in accordance with established procedures and checked for correct operation and safety.
2 Diagnose and rectify faults.	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4 Safety hazards resulting from the fault or breakdown are documented and risk control measured and devised and implemented in consultation with appropriate personnel.
	2.5 Logical diagnostic methods are applied to diagnose lift system apparatus faults employing measurements and estimations of system operating parameters referenced to system operational requirements.
	2.6 Suspected fault scenarios are tested as being the cause(s) of system fault.

ELEMENT**PERFORMANCE CRITERIA**

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|---|--|--|
| | 2.7 | Cause of the fault is identified and appropriately competent persons are engaged to rectify the fault where it is outside the scope of the lift systems. |
| | 2.8 | Faults in the lift components of the system are rectified to raise apparatus and system to its operational standard. |
| | 2.9 | System is tested to verify that the system operates as intended and to specified requirements |
| | 2.10 | Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes. |
| | 2.11 | Diagnosis and rectification activities are carried out efficiently without unnecessary waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices. |
| 3 | Completion and report fault diagnosis and rectification activities | |
| | 3.1 | OHS work completion risk control measures and procedures are followed. |
| | 3.2 | Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares. |
| | 3.3 | Rectification of faults is documented in accordance with established procedures.

Note.
Examples of documentation are components fault reports, test results, authorisations, permits, parts/component dispatch and store records |
| | 3.4 | Appropriate person or persons notified, in accordance with established procedures, that the system faults have been rectified. |

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 safe working practices and diagnosing and rectifying faults in lifts systems.

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

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Traction lift systems

Evidence shall show an understanding of the operation of the various types of lifts and the emergency procedures for the release of trapped passengers to an extent indicated by the following aspects:

T1 Technical standards, regulations and codes for lifts and escalators encompassing:

- Lift Code
- Australian Standards relevant to lift systems

T2 Lift systems – drive types, construction and operation of passenger, goods and service lifts encompassing:

- Drive types
- Drive constructions
- Drive operations
- Single and team manual handling
- Communication on site
- Emergency procedures
- Passenger
- Goods
- Service

T3 Lift machine room encompassing:

- access
- Machine
- Controller
- Governor
- Floor selector

T4 Lift well equipment encompassing:

- Guide rails
- Landing doors and locks
- Limit switches/operating devices
- Ropes

REQUIRED SKILLS AND KNOWLEDGE

- Roping systems
- Counterweights

T5 Lift pit encompassing:

- access
- Buffers
- Compensators
- Safety equipment

T6 Lift car encompassing:

- access
- Frame
- Superstructure
- Door operator
- Travelling cable
- Buttons and indicators
- Communication devices
- Safety gear

T7 Lift control circuits using relay logic encompassing:

- Button circuit
- Indicator/lantern circuit
- Key switch circuits
- Fans
- Mains supply
- Power circuits
- Floor selector circuitry
- Motor room control (selector)
- Well control (transducer)
- Directional circuitry
- Slowing and stopping circuitry
- Re-levelling circuitry
- Door operator circuitry
- Acceleration circuits

T8 Lift safety circuits encompassing:

- Landing door locks
- Car door locks
- Emergency stop
- Pit switch
- Car trap-door limit switch
- Fire service

REQUIRED SKILLS AND KNOWLEDGE

- Car top switch
- Tappet switch
- Governor/switch
- Safety gear switch
- Reverse phase relay
- Phase failure relay
- Overloads
- Circuit breakers
- Limit switches
- Terminal stopping
- Door protection
- Circuit switches

T9 Lift components - electro-mechanical employing relay logic encompassing:

- Button circuit
- Indicator/lantern circuit
- Key switch circuits
- Fans
- Mains supply
- Power circuits
- Floor selector circuitry
- Motor room control (selector)
- Well control (transducer)
- Directional circuitry
- Slowing and stopping circuitry
- Re-levelling circuitry
- Door operator circuitry
- Acceleration circuits

T10 Lift components - electro-mechanical safety circuits encompassing:

- Landing door locks
- Car door locks
- Emergency stop
- Pit switch
- Car trap-door limit switch
- Fire service
- Car top switch
- Tappet switch
- Safety gear switch
- Terminal stopping
- Circuit switches are all highlighted

REQUIRED SKILLS AND KNOWLEDGE

T11 Lift components - electronic encompassing:

- Encoders
- Transducers
- Electronic boards
- Selectors
- Rectifiers
- Capacitors
- Resistors
- Processor board
- I/O board

T12 Lift components – electrical encompassing:

- Relays; reverse phase and phase failure
- Tachos
- Limit switches
- Brushes
- Selectors
- Motor/generator
- Transformers
- Fuses
- Lamps
- Terminals

T13 Lift electrical layout and special requirements encompassing:

- Lift Code and AS 3000 requirements
- Special lift symbols
- Conduits
- Travelling cable
- Troughing
- Colour coding and labelling
- Segregation LV/ELV
- Communication cabling

T14 Traction encompassing:

- Speed/load characteristics
- Efficiency
- Application
- Brakes
- Electric prime mover (motor types and control)

T15 Geared types including rack and pinion and chain encompassing:

- Speed/load characteristics

REQUIRED SKILLS AND KNOWLEDGE

- Efficiency
- Application
- Brakes
- Electric prime mover (motor types and control)
- Drum

T16 Electric lifts – mechanics encompassing:

- Governors Governor types including; vertical shaft, overspeed devices, horizontal shaft
- Governor operation testing and rope tension testing
- Safety gear Types; A instantaneous, B flexible guide clamp, C wedge clamp and D oil buffer
- Release procedures for each type of safety gear/governor combination
- Statutory requirements

T17 Maintenance, replacement and adjustment of mechanical lift components encompassing:

- Air cords
- Selectors
- Bearings; roller, sleeve, guide shoes, and slipper
- Door guides
- Landing doors
- Car doors
- Tapes/chains

T18 Brake types, function, operation, inspection and adjustment, circuitry, manual release and statutory requirements encompassing:

- Geared machine brakes
- Gearless machine brakes
- Brake function and statutory requirements
- Internal and external mechanical brakes
- Electrical operations including; stall motor, solenoid and hydraulic
- inspection and adjustment of mechanical and electrical brakes
- Brake circuitry
- Manual release devices and safe procedures
- Statutory requirements

T19 Electro-hydraulic lifts circuitry, controls and components encompassing:

- Electrical circuitry
- Pump motor, starter
- Governor switch
- Over travel limits
- Up, down solenoids

REQUIRED SKILLS AND KNOWLEDGE

- Up, down limit switches
- Levelling switch
- Stop button
- Faulty components diagnosis
- Hydraulic components
- Hydraulic circuitry
- Servicing

T20 Electro-hydraulic lifts - mechanical operation – fluid power principles and components, operation, arrangements, lift code and other requirements and emergency passenger release encompassing:

- Fluids
- Hydraulics
- Pascal's Law
- Safety considerations of fluids under pressure
- Pump
- Control of hydraulic pressure
- Solenoid valves
- Directional flow including pressure gauge
- Ram/cylinders, including single and multi stage
- Oil cooler
- Oil reservoir
- Filters
- Seals
- Bleeding lines
- General operation
- Types of arrangements including; side acting, direct and suspended
- Requirements of Lift Code/Standards including; viewing communication windows, labelling circuit breakers, head room/top of car, pump installation under car, anti-creep devices and closing of landing doors

T21 Emergency release procedures - trapped passengers – OHS considerations and communication with passengers encompassing:

- Enterprise requirements and procedures
- Passenger safety
- Moving under power
- Hand winding
- Determining numbers and condition of passengers
- Direction of lift travel before stopping
- Fault indication
- Status of doors
- Warnings about using controls

REQUIRED SKILLS AND KNOWLEDGE

- Warnings about standing near doors
- Information related to impending movement
- Information relating to opening of doors
- Reassurance as to safety of passengers
- Emergency medical support

T22 Escalators and moving walks components encompassing:

- Machine Brakes
- Controller
- Safety devices
- Balustrade lighting
- Steps/pallets/belts
- Hand rail
- Drive chain
- Truss
- Track systems
- Step/pallet chains
- Rollers, Tension carriage
- Hand rail earthing

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 this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitudinal 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 accordance 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. Sources of evidence need to be 'rich' in nature 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 prerequisites 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 – UEE11'. 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 this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Diagnose and rectify faults in lift systems as described as described in 8) and including:

A Governors.

B Brakes.

C Safety gear.

D Safety devices.

E Lift machines.

F Door components.

- Replace and/or adjustment of lift equipment in at least three types of lift equipment as described below

A Electro-hydraulic lift.

B Electric traction lift.

C Passenger lift.

D Goods lift.

E Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to diagnosing and rectifying faults in lifts systems.

Method of assessment 9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the industry to which this unit applies. This requires assessment 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)

For optimisation of training and assessment effort, competency

development in this unit may be arranged concurrently with unit:

UEENEEG10 Trouble-shoot and repair faults in low voltage
8A electrical apparatus and circuits

Range Statement

RANGE STATEMENT

10) This relates to the 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.

Competency shall be demonstrated in relation to diagnosing and rectifying faults in lift circuits and associated components for at least three (3) types of lift circuits/components as listed:

- Governors
- Brakes
- Safety gear
- Safety devices
- Lift machines
- Door components
- Controllers
- Release passengers from a lift, which has become immobilised

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Electrical