



Australian Government

UEENEEI111A Find and rectify faults in process final control elements

Release: 2

UEENEEI111A Find and rectify faults in process final control elements

Modification History

		UEENEEI111A	Find and rectify faults in process final control elements	
Release	Action	Core/Elective	Details	Points
2	Editorial	N/A	Show full pre-req chain in the unit.	
2	Editorial	N/A	In Pre-requisites, delete “For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2”.	
2	Editorial	N/A	In Required Skills and Knowledge, insert topic numbering.	
2	Editorial	N/A	Replace “essential knowledge and associated skills” with “required skills and knowledge”.	

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers finding and repairing faults in final control elements, including control valves, actuators and positioners. It encompasses working safely, interpreting valve specifications, applying knowledge of final control elements operating parameters, conducting tests and repairs and completing the necessary service documentation.

Application of the Unit

Application of the Unit 2)

This unit is intended for competency development in entry-level employment based programs incorporated in

approved contracts of training.

Licensing/Regulatory Information

License to practice

3)

The skills and knowledge described in this unit do not require a license to practice 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.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space and lifting and risk safety measures.

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.

- | | |
|-----------------|--|
| UEENEEE1
01A | Apply Occupational Health and Safety regulations, codes and practices in the workplace |
| UEENEEE1
07A | Use drawings, diagrams, schedules, standards, codes and specifications |
| UEENEEI10 | Use instrumentation drawings, |

Prerequisite Unit(s) 4)

1A	specification, standards and equipment manuals
UEENEEI107A	Install instrumentation and control cabling and tubing
UEENEEI108A	Install instrumentation and control apparatus and associated equipment

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 3 Writing 3 Numeracy 3

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 find and repair faults in final control elements	1.1 OHS procedures for a given work area are identified, obtained and understood
	1.2 OHS risk control measures and procedures are followed in preparation for the work.
	1.3 The nature of the fault is obtained from documentation, tests or from work supervisor to establish the scope of work to be undertaken.
	1.4 The need to test or measure operating systems is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures
	1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.6 Sources of materials that may be required for the work are established in accordance with established procedures.
	1.7 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 Find faults in final control elements and associated equipment	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures
	2.3 Fault finding is approached methodically drawing on knowledge of processes, control valves, actuators and positioners using measured and calculated values.
	2.4 Apparatus components are dismantled where necessary and parts stored to protect them against loss or damage
	2.5 Faulty components are rechecked and their fault

ELEMENT	PERFORMANCE CRITERIA
	status confirmed.
	2.6 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.7 Fault finding activities are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
3 Rectify faults in final control elements and associated equipment	3.1 OHS risk control measures and procedures for carrying out the work are followed.
	3.2 Apparatus is checked as being isolated where necessary in strict accordance OHS requirements and procedures
	3.3 Materials required to rectify faults are sourced and obtained in accordance with established procedures.
	3.4 Rectification and repairs are affected efficiently without damage to other components, apparatus or circuits.
	3.5 Effectiveness of repairs is tested in accordance with established procedures.
	3.6 Apparatus is reassembled, finally tested and prepared for return to service.
	3.7 Repairs are carried out without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
4 Completion and report fault finding and rectification activities	4.1 OHS work completion risk control measures and procedures are followed.
	4.2 Work area is cleaned and made safe in accordance with established procedures.
	4.3 Written justification is made for repairs to control valves

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Evidence shall show that knowledge has been acquired of safe working practices and finding and rectifying faults in process final control elements and associated equipment.

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

KS01-EI111 Final control elements principles and applications

A

Evidence shall show an understanding of principles of final control elements to an extent indicated by the following aspects:

REQUIRED SKILLS AND KNOWLEDGE

- T1 Control valve body and trim types and flow characteristics encompassing:
- body types and their typical applications.
 - seating and trim arrangements.
 - flow characteristics of various valves.
 - Control valve terms - leakage, turndown, rangeability, choked, flow, Cv rating, and perform basic calculations and Cv a rating
- T2 Control valve selection encompassing:
- Valve purpose size and characteristic
 - Valve manufactures specifications
 - Valve faults
- T3 Spring opposed diaphragm actuator encompassing:
- control valve actuators
 - air-to-raise
 - air-to-lower.
 - fail-safe action of a valve/actuator combination.
 - Actuator characteristics and applications encompassing:
 - actuator forces, spring rate values and process pressure on valve performance.
 - spring opposed actuator to suit air-to-open and air-to-close valves. Adjust a single seating valve for shut-off.
- T4 Valve positioners encompassing:
- valve positioner operation.
 - Calibrate/adjust valve positioners for various signals.
 - cam and spring feedback positioners on control valves.
 - pneumatic, electro-pneumatic and electro hydraulic positioners/actuators.
 - Reverse positioner control action and adjust for split range.
- T5 Power cylinder (piston actuator) types encompassing:
- test power cylinders.
 - extension and retraction forces.
 - single acting positive
 - single acting negative
 - double acting
 - Position controllers (positioners)
 - Directional control valves and pilot operators

REQUIRED SKILLS AND KNOWLEDGE

- Power cylinder pilot valve combinations - two, three and five port types, actuation and return modes: solenoid, mechanical, electrical, spring, regulator, filter and lubricator sets and pneumatic control circuits

T6 Self-acting pressure and temperature control valves encompassing:

- pressure or temperature regulating valves.
- self-acting valves to load changes.
- pressure reducing and pressure relief valves.
- self acting valve for required control point

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 the unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

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 the unit and performed in accordance with the Assessment Guidelines of this Training Package.

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

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria must 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 required skills and knowledge 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:
 - Find and rectify faults in process final control elements and associated equipment as listed as described in 8) and including:

A	Using methodical fault finding techniques
B	Finding faults efficiently
C	Replacing/rectifying and repairing components without damage

- D Providing written justification for the repairs
- E Dealing with unplanned events by drawing on the required skills and knowledge to provide appropriate solutions incorporated in a 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 must 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, the 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 finding and rectifying faults in process final control elements and associated equipment.

**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 intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the required skills and knowledge described in this unit.

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

There are no concurrent assessment recommendations for this unit.

The critical aspects of occupational health and safety covered in unit UEENEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

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.

This unit must be demonstrated in relation at least two types of final control elements including the associated equipment.

Note:

1. Examples of control valves types (by application) are additive valves, level control valve, temperature control valve, flow control valve and pressure control valve.

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)

Instrumentation and Control