Australian Government

UEENEEI112A Verify compliance and functionality of instrumentation and control installations

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEI112A Verify compliance and functionality of instrumentation and control installations

Modification History

		UEENEEI112A	Verify compliance and functionality of instrumentation and control installations	
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 pre-commissioning testing and visual inspection for verifying that installed instrumentation and control apparatus in non-hazardous areas is safe and complies with requirements. It encompasses procedures for safely conducting safety tests, conducting visual inspections, identifying non-compliance defects and reporting requirements.

Application of the Unit

Application of the Unit **2)**

This unit is intended to augment previously acquired competencies. It is suitable for employment based

programs under an approved contract of training.

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 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.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Prerequisite Unit(s) **4)**

Electrical

Instrumentation and Control

Common Unit Group

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEI101A	Use instrumentation drawings, specification, standards and equipment manuals
UEENEEI102A	Solve problems in pressure measurement components and systems
UEENEEI103A	Solve problems in density/level measurement components and systems
UEENEEI104A	Solve problems in flow measurement components and systems
UEENEEI105A	Solve problems in temperature measurement components and systems
UEENEEI106A	Set up and adjust PID control loops
UEENEEI110A	Set up and adjust advanced PID process control loops
UEENEEI113A	Setup and configure Human-Machine Interface (HMI) and industrial networks

Electrical Pathway Group

UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. circuits

Prerequisite Unit(s) **4)**

Instrumentation and Control Pathway Group

UEENEEE119A	Solve problems in multiple path extra low voltage (ELV) a.c. 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	4

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 inspect and test a instrumentation and control installations	1.1 OHS measures for the site are identified, obtained and understood
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3 Safety hazards which have not previously been identified are noted, and established risk control measures are implemented.
	1.4 Documentation or deemed to comply standard on which installation is based is reviewed and understood.
	1.5 Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site
	1.6 Tools, equipment and testing devices needed to verify compliance are obtained in accordance with established procedures and checked for correct operation and safety
	1.7 Preparatory work is checked to ensure no damage has occurred and that work complies with requirements
2 Visually inspect the installation.	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 Instrument cabling and tubing is checked for suitability for the environments in which they are installed and suitably protected from damage.

ELEMENT	PERFORMANCE CRITERIA	
	2.5	The type and configuration/sizing of instrument cabling and tubing is confirmed as meeting that specified for the installation.
	2.6	Evidence that control apparatus complies with safety and installation requirements is cited.
	2.7	Marking of control apparatus is checked for accuracy and clarity and compliance with requirements.
3 Conduct functional and safety testing.	3.1	OHS risk control measures and procedures for carrying out the work are followed.
	3.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures
	3.3	Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	3.4	Where process control apparatus operates at low voltage arrangements are made for an authorised person to conduct and report on all required electrical safety tests.
	3.5	Insulation and continuity tests are conducted on process control cabling operating at extra-low voltage.
	3.6	Process control tubing/piping is pressure tested in accordance with established practice.
	3.7	Functional and test are checks are conducted on all process control apparatus in accordance with established practice.
4 Report inspection and test findings	4.1	OHS risk control work completion measures and procedures are followed.
	4.2	Work site is cleaned and made safe in accordance with established procedures.
	4.3	Non-compliance defects are identified and reported in accordance with established

ELEMENT	PERFORMANCE CRITERIA
	procedures.
	4.4 Recommendations for rectifying defects are made in accordance with established procedures.
	4.5 Verification documentation is completed in accordance with established procedures.

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 verifying compliance and functionality of process control installations.

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

KS01-EI112A Instrumentation and control system installation, testing and verification methods

Evidence shall show an understanding of process control installation, verification and testing to an extent indicated by the following aspects:

REQUIRED SKILLS AND KNOWLEDGE

T1 Safety working practices encompassing:

- Risk management – purpose/process
- Hazards associated with materials/areas
- Risk control measures associated with materials, areas, electrical equipment, and systems

T2 Equipment selection encompassing:

- Types of test equipment
- Testing techniques

T3 Control loop installation encompassing:

- Instrument selection
- Calibration
- Control loop set up

T4 Test and verification encompassing:

- Visual inspection methods
- Electrical testing
- Pressure testing
- Loop tuning
- Trouble shooting.

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)**

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-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. 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 everyday work influence how/how much 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 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, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Verify compliance and functionality of process control installations as listed as described in 8) and including:

A	Selecting correct tools and testing equipment.
B	Identifying visual non-compliance defects
C	Using effective methods for conducting tests
D	Identifying non-compliance from test results.
E	Identifying causes of non-compliance and recommending how these should be rectified.
F	Completing verification documentation
G	Dealing with unplanned events by drawing on 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 verifying compliance and functionality of process control installations.

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 UEENEEE101A 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 to verifying compliance and functionality of at least one electrical/electronic and one pneumatic process control installation comprising a measuring transmitter, controller, final control element, indicator and cabling/tubing.

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