



Australian Government

UEENEEI107A Install instrumentation and control cabling and tubing

Release: 2

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Modification History

		UEENEEI107A	Install instrumentation and control cabling and tubing	
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 the installation and termination of instrument and control cabling and tubing for chemical, industrial or food processing systems or equipment used in medical procedures. It encompasses working safely and to standards, routing cables and tubing to specified locations, terminating cables and tubing and connecting wiring at accessories and at instruments and control apparatus and completing the necessary installation documentation.

Application of the Unit

Application of the Unit 2)

This unit covers the installation and termination of instrument and control cabling and tubing for chemical, industrial or food processing systems or equipment used in medical procedures. It encompasses working safely and to standards, routing cables and tubing to specified locations, terminating cables and tubing and connecting wiring at accessories and at instruments and control apparatus and completing the necessary installation documentation.

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

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 1A Use instrumentation drawings, specification, standards and equipment manuals

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 install cabling and tubing	1.1 OHS procedures for a given work area are identified, obtained and understood 1.2 Health and safety risks are identified, and established risk control measures and procedures in preparation for the work are followed. 1.3 Safety hazards that have not previously been identified are noted, and established risk control measures are implemented. 1.4 Installation of cabling and tubing is prepared in consultation with other affected by the work and sequenced appropriately. 1.5 The nature and location of the work is determined from documentation or appropriate person(s) to establish the scope of work to be undertaken. 1.6 Cable and tube routes are planned within the constraints of the building and plant structure, significant and regulations. 1.7 Advice is sought from appropriate persons to ensure the work is coordinated effectively with others. 1.8 Material needed for the installation work is obtained in accordance with established procedures and checked against job requirements. 1.9 Tools, equipment and testing devices needed to for the installation work are obtained in accordance with established procedures and

ELEMENT	PERFORMANCE CRITERIA
	checked for correct operation and safety.
	1.10 Preparatory work is checked to ensure no damage has occurred and that work complies with requirements.
2 Install cabling, tubing and accessories	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Plant/machines/equipment are checked as being isolated where necessary in strict accordance OHS requirements and procedures
	2.3 Cabling, tubing and accessories are installed to comply with technical standards and job specifications and requirements with sufficient excess to affect terminations.
	2.4 Accessories are installed in the required locations and within acceptable tolerances.
	2.5 Cables and conductors are terminated at accessories in accordance with manufacture's specifications and regulatory requirements
	2.6 Tubing is terminated at accessories in accordance with manufacture's specifications and regulatory requirements
	2.7 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
	2.8 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.9 Ongoing checks of the quality of installed wiring are undertaken in accordance with established procedures.
	2.10 Cabling and tubing installation is carried out efficiently without waste of materials and energy or damage to apparatus, the surrounding environment or services and using sustainable energy principles.

ELEMENT	PERFORMANCE CRITERIA
3 Completion and report installation activities	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Work site is cleaned and made safe in accordance with established procedures.
	3.3 Final checks are made to that the installed wiring conforms to requirements.
	3.4 'As-installed' cables, tubes and accessories are documented and appropriate person(s) notified 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 installing instrumentation and control cabling and tubing.

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

KS01-EI107 Instrumentation and control cables, conductors and tubing **A**

Evidence shall show an understanding of instrumentation and control cables, conductors and tubing to an extent indicated by the following aspects:

REQUIRED SKILLS AND KNOWLEDGE

- T1 Instrumentation cable types and terminations encompassing:
- Cable specifications
 - Cable applications
 - Cable preparation
 - Cable termination
 - Connection hardware
- T2 Instrumentation pneumatic/hydraulic control tubing/piping encompassing:
- Control tubing/piping
 - Pneumatic/hydraulic terms
 - Cutting pipe tubing/piping
 - Bending, shaping/setting pipe and tubing
 - Joining connecting/terminating tubing/piping
 - Instrumentation air supply maintenance

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, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Install instrumentation and control cabling and tubing as listed as described in 8) and including:
 - A Reading and interpreting drawings related to cable and tube layouts, schedules and control apparatus locations
 - B Routing, placing and securing cables and tubing to comply with requirements
 - C Placing and securing accessories accurately
 - D Maintaining fire integrity
 - E Terminating cables and tubing to comply with requirements
 - F 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 installing instrumentation and control cabling and tubing.

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)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEI108 Install instrumentation and control apparatus and
A associated equipment

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 at least three different wiring systems and two types of tubing.

Note:

1. Examples of wiring systems include armoured cable; fire performance cables e.g. MIMS; thermoplastic insulated cable; thermoplastic sheathed cable; UTP, FTP, STP and coaxial communications cables.

2. Tubing types include low pressure metallic and non-metallic tubing and high pressure 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