



Australian Government

Department of Education, Employment and Workplace Relations

UEENEEM057A Design explosion-protected electrical systems and installations - gas atmospheres

Release: 1

UEENEEM057A Design explosion-protected electrical systems and installations - gas atmospheres

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This unit covers the explosion-protection aspects of designing electrical power, control and instrumentation systems and installations. It requires the ability to establish design briefs and to pursue economical and effective design solutions.

This unit is directly equivalent to the Unit 2.18 *Design explosion-protected electrical systems and installations* in the Australian/New Zealand Standard AS/NZS 4761.1 *Competencies for working with electrical equipment for hazardous areas (EEHA) Part 1: Competency Standards*. Equivalence includes endorsement in the explosion-protection techniques listed in the Range statement of this unit.

Application of the Unit

Application of the Unit 4)

This unit augments other formally-acquired competencies in a relevant industry and shall be used only in conjunction such competencies. It applies to engineering design job function at, at least, an engineering associate level.

Note:

Examples of relevant industries include aviations, electrical installation and maintenance, fuel storage and dispensing industrial process, instrumentation and control, marine, material handling and storage, mining, and petrochemical.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit do not require a license to practice in the work place. However practice in this unit is subject to regulations directly related to occupational health and safe and contracts of training such as new apprenticeships.

Pre-Requisites

Prerequisite Unit(s) 2)

2.1) Competencies

Granting competency in this unit shall be made after confirming competency in designing electrical systems and installations at AQF level 6 or equivalent. Examples are (but not limited to):

UEENEEE015B Develop design briefs for electrotechnology projects

UEENEEG030B Design switchboards rated for high fault levels

UEENEEI023B Design electronic control systems

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

Employability Skills Information

- Employability Skills** **3)**
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 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 Establish design brief.	1.1 Site and plant specifications are obtained and reviewed to establish the system requirements.
	1.2 Classification of the area is obtained from the hazardous area layout drawings or other classification documents.
	1.3 Organizational policies and specifications for hazardous area electrical systems are obtained or established with the appropriate personnel.
2 Design system and installation.	2.1 Safety, functional and economic considerations are incorporated in system design.
	2.2 Design complies with all hazardous area requirements and includes specifications and all other necessary documentation for explosion-protected equipment, accessories and wiring systems.

ELEMENT	PERFORMANCE CRITERIA
3 Check and finalise design.	3.1 Design is checked by means of established procedures for compliance with all relevant requirements.
	3.2 Design is submitted for appropriate organizational approval and, where applicable, statutory or regulatory approval.
	3.3 Approved copies of design documents are issued for retention in the verification dossier in accordance with established procedures and requirements.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) 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 designing explosion-protected electrical systems.

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

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

- 2.22.1 Hazardous areas and explosion-protection principles
- 2.22.2.1 Explosion-protected equipment Principles
- 2.22.2.2 Explosion-protection equipment Ex certification schemes
- 2.22.3 Flameproof (Ex'd') explosion-protection technique
- 2.22.4 Increased safety (Ex'e') explosion-protection technique
- 2.22.5 Non-sparking (Ex'n') explosion-protection

REQUIRED SKILLS AND KNOWLEDGE

- technique
- 2.22.6 Intrinsic safety (Ex'i') explosion-protection technique
- 2.22.7 Pressurization (Ex'p') explosion-protection technique
- 2.22.8 Explosion-protection techniques for dusts
- 2.22.9 Common characteristics of explosion-protection techniques
- 2.22.10.1 Hazardous areas installation requirements
- 2.22.15 Hazardous areas installation planning
- 2.22.16 Common classified hazardous areas
- 2.22.20 Explosion-protected electrical systems design

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit and must be read in conjunction with the performance criteria and the range statement of the unit and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all components 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-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 accord 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 decisions about 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.

EVIDENCE GUIDE

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 must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. 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, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Design explosion-protected electrical systems as described in 8) and including:
 - A Accessing and interpreting relevant information.
 - B Providing design options and justifications including hazard risk, functionality and economic considerations.
 - C Following checking and documentation procedures.

EVIDENCE GUIDE

D Applying relevant contingency management skills.

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 also 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 designing explosion-protected electrical 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 primarily intended for learning/assessment which 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 competencies in designing electrical systems.

Range Statement

RANGE STATEMENT

8) 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 shall be demonstrated in relation to any classified gas hazardous area and all the following explosion-protection techniques:

- Flameproof, (Ex 'd')
- Increased safety, (Ex 'e')
- Intrinsic safety, (Ex 'i')
- Non-sparking, (Ex 'n')

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

2.2) Literacy and numeracy skills

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	5	Writing	5	Numeracy	5
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Custom Content Section

Competency Field 5)

Hazards

