



Australian Government

UEEHA0018 Classify areas where flammable gas or vapour hazards may arise

Release: 1

UEEHA0018 Classify areas where flammable gas or vapour hazards may arise

Modification History

Release 1. This is the first release of this unit of competency in the Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to classify areas where flammable gas or vapour hazards may arise. It includes: applying area classification recommendations from relevant codes and standards to meet objectives; gathering and analysing data relative to potential explosion hazards, including characteristics of the hazardous materials; identifying and characterising sources of release; assessing dispersion and ventilation factors; considering plant process and environmental conditions; and determining the extent of a potential release and documenting findings.

Area classification should be carried out by those who understand the relevance and significance of properties of flammable materials (gas & vapours), and those who are familiar with the process and the equipment (refer AS/NZS60079.10.2).

It applies to personnel involved in the front-end engineering and design (FEED) scopes for facilities that may contain flammable gas or vapour hazards, as well as those persons involved in the ongoing operations, maintaining and/or modification of these same facilities, during the facility life cycle. It is appropriate for people who need to meet their responsibilities as required by AS/NZS3000:2018.

Site-specific work permits may be required to work in a classified hazardous area. In addition, other permits may be required, such as confined space and to operate specific pieces of equipment such as elevated work platforms in various jurisdictions. The classification process assists in the implementation of these safe systems of work.

Additional and/or 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 work health and safety (WHS)/occupational health and safety (OHS) regulations.

This unit of competency and associated assessment requirements have been adopted from clause 2.15 of AS/NZS 4761.1:2018 Competencies for working with electrical equipment for hazardous areas (EEHA). There may be differences between the content of this unit and AS/NZS 4761.1:2018, so the Standard must be checked to ensure compliance with it. Clause 2.15 of AS/NZS 4761.1:2018 includes the following precondition for assessment:

- “A candidate seeking assessment in this unit shall have been deemed competent to gather and analyse technical data in a relevant engineering or scientific discipline at AQF 7 or NZQF level 7(BD) or equivalent.”

Pre-requisite Unit

There are no prerequisite units

Competency Field

Hazards

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Determine the type and extent of explosion hazard

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Knowledge of the safety principles and objectives of area classification and methods applied to examining the extent to which an explosive hazard may arise
- 1.2** Extensive knowledge of gas and vapour characteristics are applied
- 1.3** Consideration is given to reducing the extent of explosion hazards by the application of a hierarchy of risk controls
- 1.4** The likelihood of an explosive atmosphere occurring, in accordance with the definitions of zones, is established from process and plant layout drawings and specifications, and by consultation with process-operating personnel
- 1.5** The parameters of flammable materials and the processes by which they may arise affecting the type and extent of zones are obtained and listed together with the sources from which they came
- 1.6** Sources and grades of release of flammable gases or vapours that may occur are established from first principles with reference to process, instrumentation and plant layout drawings and specifications and by consultation with process and engineering design

	personnel
	1.7 Characteristics of release are assessed with the factors affecting those characteristics including gas mixtures 1.8 Consideration is given to eliminating or reducing the likelihood of an explosive atmosphere arising in consultation with process, operating and engineering personnel 1.9 Understanding of ventilation and dispersion aspects and the application of artificial ventilation is applied including estimations/calculations of the ventilation rates to reduce an explosive gas atmosphere in consultation with process and engineering design personnel
2 Establish the area classifications	2.1 Acceptable methods for establishing the type and extent zones are applied 2.2 The use of illustrative examples in establishing the type and extent of zones is validated in accordance with the standards and any limitations are documented 2.3 The types and extent of zones are established from the data collected in the analysis of the area and in consultation with process and engineering specialist personnel
3 Document classification process and delineation of zones	3.1 The classification process taken, relevant material properties and justification for the classifications given is documented in accordance with provisions of standards 3.2 Sources of release and zones are shown on plant drawing in accordance with provisions of standards 3.3 All classification documents are filed for future reference and forwarded to the appropriate personnel for inclusion in the verification dossier

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Electrotechnology Training Package Companion Volume Implementation Guide.

- Essential operating conditions include:
- an engineering office associated with an existing, new or proposed site where the activities may cause a flammable gas or vapour hazards to arise
 - plant specifications such as plan and elevation drawings
 - process drawings (e.g. PID diagrams)
 - relevant pipe work diagrams
 - details of vessels and storage tanks
 - climatic and topographic information of the site
 - process specifications such as liquids and gases involved, flow rates, pressures and temperatures and process descriptions and operations are required
 - process and engineering design and operational personnel
 - relevant standards and codes

Unit Mapping Information

This is a new unit.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEEHA0018 Classify areas where flammable gas or vapour hazards may arise

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- establishing the likelihood of an explosive atmosphere arising including:
 - reviewing process, instrumentation and plant layout drawings and specifications to identify sources and grades of release
 - obtaining properties of materials relevant to the area classifications
 - estimating/calculating the rates of release and release conditions
- considering means of eliminating or reducing risks of an explosive atmosphere arising in the presence of a potential ignition source including:
 - elimination or relocation of potential ignition sources
 - elimination or relocation of sources of release
- investigating the application and influence of ventilation and dispersion factors including:
 - determining the rate and availability of ventilation and dispersion factors
 - applying guidance given in standards to assess the degree of dilution and the persistence of an explosive gas atmosphere
- establishing the types and extent of zones for the final plant/process design including:
 - analysing the collected data
 - using appropriate analysis methodologies
 - consulting process and engineering specialist personnel
- documenting area classification in accordance with provisions of standards.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- safety principles and objectives of area classification encompassing safety and economic aspects including:
 - reducing the likelihood of a gas atmosphere occurring
 - using equipment that has a low likelihood of creating an ignition source

- relative cost of compliant equipment within the classified zones
- properties of hazardous materials including:
 - properties of materials relevant to area classification such as, molecular mass, flash point, boiling point, ignition temperature, vapour pressure, vapour density, explosive limits, equipment group and temperature class
 - sources from which properties of explosive hazardous material can be obtained
 - fundamentals of all alternative analysis methodologies
- sources and grades of release of a flammable gas or vapour hazard including:
 - items of plant that should be considered as potential sources of release including those giving:
 - continuous grades of release
 - primary grade of release
 - secondary grade of release
 - the criteria on which openings are considered a source of release
 - the criteria for establishing the zones in which an explosive atmosphere may arise
 - release rate of gas or vapour including:
 - geometry of the source of release
 - release velocity
 - concentration
 - volatility of a flammable liquid
 - liquid temperature
 - methods and equations for estimating the release rate of liquid and the release rate of gas, including the limitations and accuracy of the selected equations
- ventilation and dispersion including:
 - location of sources of release in relation to ignition sources
 - effects of climatic conditions and topography
 - nature and mechanisms for dispersion and dilution
 - ventilation including:
 - purpose
 - types and degrees of ventilation
 - methods for estimating and calculating ventilation and dispersion criteria
 - influence of independent ventilation on types of zones
 - multiple sources of release
- acceptable methods for establishing the type and extent of zones including:
 - limitations and application in the use of illustrative examples
 - generalized methods
 - limitations and use of calculation methodologies in relevant standards
 - suitability and use of modelling tools such as CFD
 - alternative codes
 - relationship to 'equipment protection level' (EPL) and risk assessment

- fundamentals of all alternative analysis methodologies
- recommendations for documenting classification decisions including:
 - steps which lead to the final area classification including:
 - recommendations from relevant standards and codes
 - gas and vapour characteristics and calculations
 - study of ventilation and dispersion characteristics
 - data sheets and tables listing flammable material characteristics and sources of release
 - drawings showing the type and extent of zones, equipment groups and ignition temperature.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate tools and testing devices and PPE currently used in industry
- the following equipment and documentation in relation to several different processes:
 - plant specification and design including:
 - plan and elevation drawing
 - process drawings such as PID diagrams
 - relevant pipe work diagrams
 - relevant details of process equipment including vessels and storage tanks
 - relevant climatic and topographic information of the site
 - process specification including:
 - liquids and gases involved
 - flow rates, pressures and temperatures
 - process and operational (if available) descriptions
 - relevant standards and codes.

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