Title	**Classify hazardous areas**		
Level	**6**	**Credits**	**4**

Purpose	This unit standard is for engineers or engineering associates who are responsible for classifying areas where flammable or combustible materials may exist. People credited with this unit standard are able to: – demonstrate knowledge of explosive atmospheres and explosion-protection principles – demonstrate knowledge of processes involved in gathering and analysing technical data to classify non-specific hazardous areas – determine the type and extent of explosion hazard – establish the type and extent of classes or zones, and – document classification and delineation of zones.

Classification	Explosive Atmospheres > Electrical Apparatus in Explosive Atmospheres - Compliance

Available grade	Achieved

Guidance Information

1 This unit standard has been designed for training and assessment on-job or off-job in a simulated environment which includes explosion-protected apparatus and wiring systems similar to those encountered in a real workplace.

2 This unit standard is equivalent to *Classify area where flammable gas or vapour hazards may arise* and *Classify areas where a combustible dust hazard may arise* in AS/NZS 4761.1 (version as cited in the Electricity (Safety) Regulations) *Competencies for working with electrical equipment for hazardous areas (EEHA) - Competency Standards*.

3 This unit standard is intended to be used in conjunction with other work skills related to gathering and analysing technical data at NZQF Level 4 or above.

4 Competence is to be demonstrated in relation to any hazardous areas in which the classification cannot be directly identified by common situations or specific examples.

5 References
– AS/NZS 1768:2007, *Lightning protection*
– AS/NZS 3000 (version as cited in the Electricity (Safety) Regulations), *Electrical installations (known as the Australian/New Zealand Wiring Rules)*

- AS/NZS 4761.1 (version as cited in the Electricity (Safety) Regulations), *Competencies for working with electrical equipment for hazardous areas (EEHA) - Competency Standards*
- AS/NZS IEC 60079.10.1:2022*, Explosive atmospheres – Part 10.1: Classification of areas – Explosive gas atmospheres*
- Electricity Act 1992
- Electricity (Safety) Regulations 2010
- Health and Safety at Work Act 2015, and associated regulations
- *Workplace Exposure Standards and Biological Exposure Indices Edition 13*, available from WorkSafe New Zealand www.worksafe.govt.nz, and associated regulations

and all subsequent amendments and replacements.

6 Definitions

Apparatus group – Group I is for apparatus for coal mines. Group II is for gases and vapours in surface industries, and is divided into Groups IIA, IIB and IIC for substances with increasing ease of ignition. Group III is for dusts in surface industries, and is similarly divided into Groups IIIA, IIIB and IIIC. These are added as roman number suffixes to explosion-protection technique markings on apparatus and on Certificates of Compliance.

Appropriate personnel – individuals with responsibilities for co-ordination, design, installation, maintenance, production, or servicing activities. This can include: Site managers, project managers, engineers and technicians, technical experts, line managers or supervisors, regulatory personnel, team leaders, other personnel designated by an organisation or enterprise.

Explosion-protected apparatus – electrical apparatus to which specific measures are applied to avoid ignition of a surrounding explosive atmosphere.

Explosive atmosphere – an atmosphere comprising volatile substances mixed with air under atmospheric conditions in the form of gases, vapours, mist, or dust in which, after ignition has occurred, combustion spreads to the entire unburned mixture.

Hazardous area – area in which an explosive atmosphere is present or may be expected to be present in quantities such as to require special precautions for the construction, installation, and use of apparatus.

LEL – lower explosive limit – concentration of flammable gas or vapour in air, below which an explosive gas atmosphere will not be formed.

Process specialist personnel – responsible persons with expertise in the technical aspects of the activities that produce the explosive hazard including but not limited to chemical engineers, process engineers, mining engineers, and safety managers.

Temperature class – classification system of electrical apparatus, based on its maximum surface temperature, related to the specific explosive atmosphere for which it is intended to be used.

UEL – upper explosive limit – concentration of flammable gas or vapour in air, above which an explosive gas atmosphere will not be formed.

Verification dossier – a set of documents showing the complete compliance history of electrical apparatus and installations within hazardous areas, as defined in Standards.

7 Range

a Assessment is to take account of variations between the industry sectors and enterprises. For example, apparatus used in dust-explosive atmospheres will be different in some respects from that used in a petrochemical plant.

b Health and safety policies and procedures may include but are not limited to – work permits and clearances, hazard monitoring, evacuation procedures, plant and electrical isolation.
c Established maintenance procedures must be followed.
d All activities and evidence presented for all outcomes and performance criteria in this unit standard must be in accordance with safe working principles and practices, legislation, workplace policies and procedures, Standards, safe and sound practice, and industry practice; and, where appropriate, manufacturers' instructions, specifications, and data sheets.

Outcomes and performance criteria

Outcome 1

Demonstrate knowledge of explosive atmospheres and explosion-protection principles.

Performance criteria

1.1 Identify and explain the properties of combustible substances and their potential to create an explosive hazard.

Range conditions that will lead to an explosion, explosive range of substances including LEL and UEL, flashpoint.

1.2 Explain the terms *combustion*, *ignition*, and *propagation* and relate them to explosion-protection activities and environment.

1.3 Describe explosive parameters of substances, as given in tables of substance characteristics, in terms of the properties of combustible materials.

Range LEL and UEL of gases, vapours from liquids, flash points of liquids, dusts.

1.4 Identify the toxic nature of gases and vapours and dusts, and their potential harmful consequences.

1.5 Describe the nature of hazardous areas.

Range Standards definitions of hazardous areas, explosive atmospheres, apparatus groups, temperature classes and their relationship to the substances present;
the concept of zones in terms of likelihood or frequency and duration of the presence of an explosive atmosphere in that location;
the need for zone classification by specialists using Standards.

1.6 Describe methods of achieving explosion-protection in terms of energy limitation, exclusion, containment, dilution, and elimination of ignition source.

Range intrinsic safety (Ex I), other principal methods.

1.7 Describe typical safety procedures to be followed before entering a hazardous area and the main features and purpose of a clearance to work system.

Range includes but is not limited to – hot work permit systems.

1.8 Describe the roles and responsibilities of the parties involved in the safety of hazardous areas.

Range Acts and regulations related to the safety of hazardous areas and the authorities responsible for their implementation;
where assistance and further information can be obtained to help persons with hazardous areas responsibilities;
the hazardous areas responsibilities of the owner of premises, and of the occupier of premises;
enterprises and personnel engaged in classification, installation, maintenance, design, overhaul, and/or modification, assessment, and inspection of explosion-protection systems and/or installations;
manufacturers of explosion-protected apparatus;
designated authorities.

Outcome 2

Demonstrate knowledge of processes involved in gathering and analysing technical data to classify non-specific hazardous areas.

Performance criteria

2.1 Describe the process of classifying hazardous areas.

Range methods; characteristics or attributes of an area including type of process, nature of plant, source, and nature of release;
requirements and Standards for classifying a hazardous area; the responsibilities of the owner or occupiers for classification of a hazardous area.

2.2 Describe the likelihood (zoning) or risk assessment method of an explosive hazard.

2.3 Describe the ignition properties of materials relevant to determining the likelihood and extent of an explosive hazard.

2.4 Identify sources for obtaining data on ignition properties of materials under the conditions in which they could be present in a given process.

2.5 Describe methods for assessment and calculation of factors to classify non-specific hazardous areas.

Range release rate, ventilation, dispersion characteristics.

2.6 Explain means for reducing hazard risk.

2.7 Identify and describe the extent of an explosive hazard and classify an area accordingly.

Range the extent of zones for an area, given data on the likelihood of the explosive hazard for that area; requirements for documenting the classification of a hazardous area; the extent of the zones, temperature classes and apparatus groups on site drawings in a hazardous area.

Outcome 3

Determine the type and extent of explosion hazard.

Performance criteria

3.1 Determine functions and process apparatus in the area and identify hazardous materials from specifications, hazard, and risk and/or written consultation with process specialist personnel.

Range accessing information and identifying hazardous products involved in a given process, explosive properties of materials involved in a given process, potential sources and characteristics of release of hazardous products.

3.2 List the explosive and physical properties of hazardous materials, with the title of the authority from which the data is obtained.

Range accessing information and identifying hazardous products involved in a given process, explosive properties of materials involved in a given process, potential sources and characteristics of release of hazardous products.

3.3 Establish from collected data the apparatus groupings and temperature class of flammable gases, vapours, and/or dusts that may be present in the area.

Range accessing information and identifying hazardous products involved in a given process, explosive properties of materials involved in a given process, potential sources and characteristics of release of hazardous products.

3.4 Potential sources of release and/or dusts layering are identified from specifications, and/or written consultation with process specialist personnel and data in the context of explosion risk is analysed.

Outcome 4

Establish the type and extent of classes or zones.

Performance criteria

4.1 Determine zones by similarity to examples in Standards or from first principles.

4.2 Where first principles are used, establish sources and magnitude of release and dusts layering from specifications and diagrams and confirm with process specialist personnel.

Range includes but is not limited to – ventilation assessment, housekeeping assessment, calculations.

Outcome 5

Document classification and delineation of zones.

Performance criteria

5.1 Complete area classification documentation in accordance with workplace requirements and submit it to appropriate personnel.

5.2 File area classification documentation records for future reference and for incorporation in the verification dossier.

Planned review date	31 December 2027

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	29 August 2000	31 December 2025
Review	2	20 May 2011	31 December 2025
Review	3	2 March 2023	N/A

Consent and Moderation Requirements (CMR) reference	0003

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council qualifications@WaihangaAraRau.nz if you wish to suggest changes to the content of this unit standard.