

Professional Diploma in Hazardous Safety Engineering

Course Objective

This course provides the information and knowledge related to safely working in hazardous areas, safe working knowledge, safety protection equipments, systems and methods, auditing the safety requirements of hazardous area engineering works such as mining, petroleum, chemical plants ,civil ,electrical and mechanical engineering

Pre-requisite

Professional Diploma/ Bachelor degree in Engineering (Any discipline)

Course Outline

It consists of 8 units with each 5 credits.

BAE 631E Maintenance & Repair Works in Hazardous Areas

BAE 632E Electrical Wiring in Hazardous Areas

BAE 633E Hazardous Area Safety Audits

BAE 634E Explosion Protection

BAE 635E Testing in Hazardous Areas

BAE 636E Hazardous Area Inspection

BAE 637E Hazardous Chemical Management

BAE 638E Environmental Engineering in Hazardous Areas

Study Method & Assessment

The students will need to read the reference materials provided in folder of each unit & write the report on their study for each unit.

The report should contain

- Summary of knowledge acquired in the unit
- Practical methods related to assessment, safe working, protection, technical data, equipments utilized in hazardous areas
- Practical applications in work place
- Specific applications in the area of your choice
- Reference guides etc

Each report should be Arial 11 fonts with 10 to 20 pages written in own words by using English..

Insert the appropriate diagrams & tables, formula and data related to information.

Detailed Topics

BAE 631 Maintenance & Repair Works in Hazardous Areas

UEENEEM019A Attend to breakdowns in hazardous areas - coal mining

KS01-EM01

9A

Explosion protection, certification and techniques

Evidence shall show an understanding of Ex certification schemes and techniques to accepted Standards to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).
- ☐ Typical situations where the flameproof explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Flameproof technique;
- ☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity

versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires)

UEENEEM020A Attend to breakdowns in hazardous areas - gas

Atmospheres

KS01-EM020

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Explosion protection, certification and techniques

Evidence shall show an understanding of Ex certification schemes and techniques to accepted Standards to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics

and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex

'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☒ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

UEENEEM021A Attend to breakdowns in hazardous areas - dust

Atmospheres

KS01-EM021

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Explosion protection, certification and techniques

Evidence shall show an understanding of Ex certification schemes and techniques to accepted Standards to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☒ Purpose and scope of certification schemes.

☒ Schemes accepted in Australia and New Zealand.

☒ Schemes commonly used in countries other than Australia and New Zealand.

☒ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☒ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☒ Typical situations where the flameproof explosion-protection technique is used;

☒ Actions or conditions that would void the protection provided the Flameproof

technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

- ☐ Typical situations where the each dust explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the each dust technique;
- ☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

- ☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.
- ☐ Compliance plate markings.
- ☐ Limitations of non-metallic or specific alloy enclosures.
- ☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.
- ☐ Environmental conditions that may impact on explosion-protection techniques.
- ☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').
- ☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

UEENEEM022A Attend to breakdowns in hazardous areas – pressurisation

KS01-EM02

2A

Explosion protection, certification and techniques

Evidence shall show an understanding of Ex certification schemes and techniques to accepted Standards to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

UEENEEM027A Maintain equipment in hazardous areas - coal mining

KS01-EM027

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Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design

features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

☐ OHS procedures to be followed when working in a hazardous area; the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;

☐ the typical contents of a verification dossier and their purpose; and

☒ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

☒ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;

☒ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and

☒ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

☒ the wiring systems permitted and not permitted in or above hazardous areas;

☒ equipment not permitted in or above hazardous areas;

☒ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and

☒ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

☒ the purpose of a maintenance schedule;

☒ the purpose and extent of 'close', 'sample' and 'periodic' inspections;

☒ the features of each explosion-protection techniques that should be included in a maintenance schedule;

☒ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;

☒ the documentation requirements for recording the maintenance process and

results;

☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

☐ explosion protection features of cable terminations devices.

☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)

☐ terminating a cable with a barrier gland. (Gases only.)

☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.

☐ testing termination/connections of installed cables/circuits.

UEENEEM028A Maintain equipment in hazardous areas - gas

Atmospheres

KS01-EM028

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Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted

breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or

drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)
- ☐ terminating a cable with a barrier gland. (Gases only.)
- ☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.
- ☐ testing termination/connections of installed cables/circuits.

UEENEEM029A Maintain equipment in hazardous areas - dust

Atmospheres

KS01-EM029

A

Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

Typical situations where the flameproof explosion-protection technique is used;

- ☐ Actions or conditions that would void the protection provided the Flameproof technique;
- ☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).
- ☐ Typical situations where the Increased safety explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Increased

safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

☐ OHS procedures to be followed when working in a hazardous area; the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;

☐ the typical contents of a verification dossier and their purpose; and

☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;

☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and

☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

☐ the wiring systems permitted and not permitted in or above hazardous areas;

- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)
- ☐ terminating a cable with a barrier gland. (Gases only.)
- ☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.
- ☐ testing termination/connections of installed cables/circuits.

UEENEEM030A Maintain equipment in hazardous areas – pressurisation

KS01-EM030A Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

- ☐ Typical situations where the flameproof explosion-protection technique is used;

Actions or conditions that would void the protection provided the Flameproof technique;

- ☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance

distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

REQUIRED SKILLS AND KNOWLEDGE

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus

grouping’.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex ‘m’; oil-immersion Ex ‘o’; powder-filling Ex ‘q’, ventilation Ex ‘v’ and special protection Ex ‘s’).

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

☐ OHS procedures to be followed when working in a hazardous area;

☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;

☐ the typical contents of a verification dossier and their purpose; and

☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;

☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and

☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous

areas requirements. (Gases only.)

terminating a cable with a barrier gland. (Gases only.)

☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.

☐ testing termination/connections of installed cables/circuits.

UEENEEM047A Develop and manage maintenance programs for hazardous areas electrical equipment - coal mining

KS01-EM047

A

Hazardous areas maintenance management

Evidence shall show an understanding of hazardous areas maintenance management to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof

technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

- ☐ Typical situations where the each dust explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the each dust technique;
- ☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

- ☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.
- ☐ Compliance plate markings.
- ☐ Limitations of non-metallic or specific alloy enclosures.

The purpose of conformity and certification/approval for equipment used in hazardous areas.

- ☐ Environmental conditions that may impact on explosion-protection techniques.
- ☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').
- ☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment,

including corrosion and frequency of maintenance;

☐ the documentation requirements for recording the maintenance process and results; and

☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T10 The responsibilities of a person managing activities or a site related to a hazardous area, encompassing:

☐ OHS procedures that are to be established;

☐ responsibilities for ensuring that a hazardous area is safe; and

☐ responsibilities and processes for establishing and maintaining a verification dossier.

T11 Explosion-protection strategies in relation to a hazardous area, encompassing:

☐ the process of classifying a hazardous area;

☐ various ways in which electrical systems /apparatus can be treated to prevent them from becoming an ignition source; and

☐ the cost of the different ways of treating electrical systems/apparatus associated with hazardous areas.

T12 Requirements for the maintenance of electrical systems associated with hazardous areas, encompassing:

☐ the type and grades of inspection of hazardous areas;

☐ maintenance programs for electrical explosion-protected systems/apparatus;

And documentation requirements associated with maintenance procedures.

BAE 632 Electrical Wiring in Hazardous Areas

UEENEEM023A Install explosion-protected equipment and wiring systems

- coal mining

KS01-EM023

A

Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).
- ☐ Typical situations where the flameproof explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Flameproof technique;
- ☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic

safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

- ☐ Limitations of non-metallic or specific alloy enclosures.
- ☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.
- ☐ Environmental conditions that may impact on explosion-protection techniques.
- ☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').
- ☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous

encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)
- ☐ terminating a cable with a barrier gland. (Gases only.)

☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.

☐ testing termination/connections of installed cables/circuits.

UEENEEM025A Install explosion-protected equipment and wiring systems

- dust atmospheres

KS01-EM02

5A

Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation

of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).
- ☐ Typical situations where the Increased safety explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Increased safety technique;
- ☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).
- ☐ Typical situations where the Non-sparking explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Non-sparking technique; and
- ☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics

and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust

technique;

☒ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☒ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☒ Compliance plate markings.

☒ Limitations of non-metallic or specific alloy enclosures.

☒ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☒ Environmental conditions that may impact on explosion-protection techniques.

☒ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☒ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

☒ OHS procedures to be followed when working in a hazardous area;

☒ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;

☒ the typical contents of a verification dossier and their purpose; and

☒ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or

written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)
- ☐ terminating a cable with a barrier gland. (Gases only.)
- ☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.
- ☐ testing termination/connections of installed cables/circuits.

UEENEEM026A Install explosion-protected equipment and wiring systems

- pressurisation

KS01-EM02

6A

Explosion protection installation and maintenance requirements

Evidence shall show an understanding of explosion protection installation and maintenance requirements to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics

and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the

Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation

of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).
- ☐ Typical situations where the each dust explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the each dust technique;
- ☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

- ☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.
- ☐ Compliance plate markings.
- ☐ Limitations of non-metallic or specific alloy enclosures.
- ☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.
- ☐ Environmental conditions that may impact on explosion-protection techniques.
- ☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').
- ☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
 - ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in

a maintenance schedule;

☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;

☐ the documentation requirements for recording the maintenance process and results;

☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

☐ explosion protection features of cable terminations devices.

☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)

☐ terminating a cable with a barrier gland. (Gases only.)

☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.

☐ testing termination/connections of installed cables/circuits.

BAE633 Safety Audit in Hazardous Areas

UEENEEM036A Conduct a conformity assessment of explosion-protected equipment - gas atmospheres

KS01-EM036

A

Explosion-protected equipment conformity assessment

Evidence shall show an understanding of explosion-protected equipment conformity assessment to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

- ☐ the main features and purpose of a 'clearance to work' system (includes hot work permit systems).
- ☐ typical safety procedures that should be followed before entering a hazardous area;
- ☐ the purpose of gas detectors and their limitations;
- ☐ effects of temperature on gas and vapour detection;
- ☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- ☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- ☐ safety in use of gas detectors, for example, 'read and run concept'
- ☐ the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas encompassing:

- ☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and
- ☐ the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers

of explosion-protected equipment; designated authorities; insurers.

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

- ☐ condition in the workplace that will lead to an explosion;
- ☐ the terms 'combustion', 'ignition' and 'propagation';
- ☐ explosive range of substances encountered in the workplace i.e. LEL/UEL;
- ☐ explosive parameters of substances as given in tables of substance properties
- ☐ Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.
- ☐ the difference between gases and vapours; and
- ☐ the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

- ☐ the Standards definition of a 'hazardous area';
- ☐ the recommended methods for classifying the type and degree of explosion hazard in an area;
- ☐ hazardous area classifications as defined by Standards; and
- ☐ factors that are considered when a hazardous area is classified.
- ☐ the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 Explosive-protected equipment encompassing:

- ☐ The principles of each explosion-protection technique, the methods used and how each technique works (Flameproof (Ex 'd'); Increased safety (Ex 'e'); Non-sparking (Ex 'n'); Intrinsic safety (Ex 'i') and Pressurization (Ex 'p') for gas atmospheres and Dust-exclusion enclosures (Ex 'tD'); Pressurization (Ex 'pD'); Encapsulation (Ex 'mD'); and Intrinsic safety (Ex 'iD') for dusts)
- ☐ How explosion-protected equipment is identified by the 'Ex' symbol marked

on the equipment, including old equipment and equipment certified in another country.

☐ Visible conditions or actions that would void the explosion-protection provided by a particular technique.

T6 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T7 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T8 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance

distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T9 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T10 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T11 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T12 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T13 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

- ☐ Compliance plate markings.
- ☐ Limitations of non-metallic or specific alloy enclosures.
- ☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.
- ☐ Environmental conditions that may impact on explosion-protection techniques.
- ☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').
- ☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T14 The compliance certification and the 'Ex' scheme for recognition of certification encompassing:

- ☐ the purposes of certification of explosion-protected equipment;
- ☐ the parties involved in the assessment/testing and certification of explosion-protected equipment and their responsibilities; and
- ☐ the process for recognition of assessment/testing and certification of explosion-protected equipment from other countries.

T15 The preparation required to assess explosion-protected equipment for compliance with Standards encompassing:

- ☐ the special safety measures that should be taken when assessing/testing explosion-protected equipment;
- ☐ documentation required prior to conducting conformity assessment;
- ☐ tests necessary to establish that an item of explosion-protected equipment conforms with relevant Standards; and
- ☐ situations where testing is not applicable or required.

T16 Assessing and testing explosion-protected equipment encompassing:

- ☐ assessment and test requirements; and
- ☐ procedures for conducting a conformity assessment.

T17 Documentation used in assessing explosion-protected equipment for conformance to accepted Standards encompassing:

- ☐ The documentation and Standard(s) required to begin an assessment.
- ☐ The differences between the test requirements of Standards from other countries and the compliant/acceptable Standards against which the equipment is being assessed.
- ☐ Results given in equipment test reports.
- ☐ Conformity assessment processes and procedures.

T18 Assessing to a current acceptable Standard existing equipment that has been certified to previously acceptable Standards encompassing:

- ☐ processes and procedures used; and
- ☐ possible outcomes.

T19 A clause by clause assessment between the equipment manufacturing Standard(s) and the current acceptable Ex Standards encompassing:

- ☐ processes and procedures used; and
- ☐ differences between the Standards that may be detected.

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

KS01-EM05

7A

Hazardous area electrical systems design

Evidence shall show an understanding of hazardous area electrical systems design to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas

encompassing:

- ☐ the main features and purpose of a 'clearance to work' system (includes hot work permit systems).
- ☐ typical safety procedures that should be followed before entering a hazardous area;
- ☐ the purpose of gas detectors and their limitations;
- ☐ effects of temperature on gas and vapour detection;
- ☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- ☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- ☐ safety in use of gas detectors, for example, 'read and run concept'
- ☐ the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas

encompassing:

- ☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced

UEENEEM068A Assess the fitness-for-purpose of hazardous areas

explosion-protected equipment - gas atmospheres

KS01-EM068

A

Explosion-protected equipment fitness-for-purpose

Evidence shall show an understanding of explosion-protected equipment

fitness-for-purpose to an extent indicated by the following aspects:

T1 Preparation to install and maintain explosion-protected equipment in

hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T2 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;

- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T3 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T4 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;

- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T5 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T6 The relationship between the documentation held in a verification dossier and the installed equipment encompassing:

- ☐ consistency between the location and type of equipment with the area classification details in the verification dossier; and
- ☐ equipment certification and any attached conditions that relate to the equipment as it is installed.

T7 Inspecting a hazardous area installation encompassing:

- ☐ typical processes for undertaking the inspection of a hazardous area installation;
- ☐ requirements applicable to a given installation; and
- ☐ reporting of an inspection of a hazardous area installation.

T8 Documentation used in assessing explosion-protected equipment for conformance to accepted Standards encompassing:

- ☐ The documentation and Standard(s) required to begin an assessment.
- ☐ The differences between the test requirements of Standards from other countries and the compliant/acceptable Standards against which the equipment

is being assessed.

☐ Results given in equipment test reports.

☐ Conformity assessment processes and procedures.

T9 Assessing to a current acceptable Standard existing equipment that has been certified to previously acceptable Standards encompassing:

☐ processes and procedures used; and

☐ possible outcomes.

T10 A clause by clause assessment between the equipment manufacturing Standard(s) and the current acceptable Ex Standards encompassing:

☐ processes and procedures used; and

☐ differences between the Standards that may be detected.

T11 Techniques used in fitness-for purpose assessment of equipment for use in hazardous areas encompassing:

☐ Processes for verifying that a design specification meets the integrity of the equipment, showing the equipment is fit-for-purpose and is safe to use:

☐ Standards against which fitness-for-purpose assessment is made;

☐ the need to maintain the accuracy/calibration of measuring/test devices/tools;

☐ assessment and measurements/tests requirements for determining that an item of explosion-protected equipment complies with the relevant Standards and meets the certification requirements;

☐ testing that is/is not required to determine compliance of the equipment being assessed; and

☐ development of different tests to those given in Standards and justification as to how they achieve the same result.

☐ Typical specification for the equipment to be assessed as fit-for-purpose.

T12 Processes used in auditing hazardous areas encompassing:

☐ Requirements to retain hazardous areas documentation on site.

☐ Components of an audit:

☐ authenticity of documentation;

hazardous areas delineations shown in site diagrams;

☐ location and operating parameters of equipment shown in certification documents;

☐ compliance of equipment location;

☐ compliance of wiring systems; and

☐ alignment of hazardous areas documentation to as-built installation.

☐ Reporting non-conformance of an installation.

BAE 634 Explosion Protection Equipments & Methods

UEENEEM080A Report on the integrity of explosion-protected equipment
in a hazardous area

KS01-EM080A Hazardous areas and explosion-protection
principles

Evidence shall show an understanding of hazardous areas and explosion-protection principles (including working safely in hazardous areas), principles of the following explosion-protection techniques and visible conditions of explosion-protection equipment that indicate the protection is void and changes in the nature of the explosion hazard that may render the explosion-protection unsafe. to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

the main features and purpose of a 'clearance to work' system (includes hot work permit systems).

☐ typical safety procedures that should be followed before entering a hazardous area;

☐ the purpose of gas detectors and their limitations;

- ☐ effects of temperature on gas and vapour detection;
- ☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- ☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- ☐ safety in use of gas detectors, for example, 'read and run concept'
- ☐ the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas encompassing:

- ☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and
- ☐ the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers of explosion-protected equipment; designated authorities; insurers.

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

- ☐ condition in the workplace that will lead to an explosion;
- ☐ the terms 'combustion', 'ignition' and 'propagation';

☒ explosive range of substances encountered in the workplace i.e. LEL/UEL;

☒ explosive parameters of substances as given in tables of substance properties

Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.

☒ the difference between gases and vapours; and

☒ the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

☒ the Standards definition of a 'hazardous area';

☒ the recommended methods for classifying the type and degree of explosion hazard in an area;

☒ hazardous area classifications as defined by Standards; and factors that are considered when a hazardous area is classified.

☒ the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 Explosive-protected equipment encompassing:

☒ The principles of each explosion-protection technique, the methods used and how each technique works (Flameproof (Ex 'd'); Increased safety (Ex 'e');

Non-sparking (Ex 'n'); Intrinsic safety (Ex 'i') and Pressurization (Ex 'p') for gas atmospheres and Dust-exclusion enclosures (Ex 'tD'); Pressurization (Ex 'pD');

Encapsulation (Ex 'mD'); and Intrinsic safety (Ex 'iD') for dusts)

☒ How explosion-protected equipment is identified by the 'Ex' symbol marked on the equipment, including old equipment and equipment certified in another country.

☒ Visible conditions or actions that would void the explosion-protection provided by a particular technique.

T6 Explosion-protection visual checks encompassing:

☒ occupational, health and safety procedures to be followed before entering hazardous areas; and while conducting visual inspection.

- ☐ Visible defects in explosion-protected equipment and wiring.
- ☐ Conditions that may indicate a change in a given explosion hazard.
- ☐ Reporting defects in explosion-protected equipment and wiring - the purpose of a verification dossier; and various ways for reporting defects in explosion-protected equipment and wiring.
- ☐ procedures to be followed in the event of a change in the explosion hazard.

UEENEEM065A Conduct audit of hazardous areas installations - gas

Atmospheres

KS01-EM065

A

Hazardous areas installation auditing

Evidence shall show an understanding of hazardous areas installation auditing to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

- ☐ the main features and purpose of a 'clearance to work' system (includes hot work permit systems).
- ☐ typical safety procedures that should be followed before entering a hazardous area;
- ☐ the purpose of gas detectors and their limitations;
- ☐ effects of temperature on gas and vapour detection;
- ☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- ☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- ☐ safety in use of gas detectors, for example, 'read and run concept'

☐ the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas

encompassing:

☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and

☐ the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers of explosion-protected equipment; designated authorities; insurers.

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

☐ condition in the workplace that will lead to an explosion;

☐ the terms 'combustion', 'ignition' and 'propagation';

☐ explosive range of substances encountered in the workplace i.e. LEL/UEL;

☐ explosive parameters of substances as given in tables of substance properties

☐ Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.

☐ the difference between gases and vapours; and

☐ the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

- ☐ the Standards definition of a 'hazardous area';
- ☐ the recommended methods for classifying the type and degree of explosion hazard in an area;
- ☐ hazardous area classifications as defined by Standards; and
- ☐ factors that are considered when a hazardous area is classified.
- ☐ the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 Explosive-protected equipment encompassing:

- ☐ The principles of each explosion-protection technique, the methods used and how each technique works (Flameproof (Ex 'd'); Increased safety (Ex 'e'); Non-sparking (Ex 'n'); Intrinsic safety (Ex 'i') and Pressurization (Ex 'p') for gas atmospheres and Dust-exclusion enclosures (Ex 'tD'); Pressurization (Ex 'pD'); Encapsulation (Ex 'mD'); and Intrinsic safety (Ex 'iD') for dusts)
- ☐ How explosion-protected equipment is identified by the 'Ex' symbol marked on the equipment, including old equipment and equipment certified in another country.
- ☐ Visible conditions or actions that would void the explosion-protection provided by a particular technique.

T6 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T7 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T8 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T9 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted

breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T10 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T11 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T12 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T13 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed or use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or

drain wires).

T14 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T15 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T16 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T17 Processes used in auditing hazardous areas encompassing:

- ☐ Requirements to retain hazardous areas documentation on site.

- ☐ Components of an audit:
- ☐ authenticity of documentation;
- ☐ hazardous areas delineations shown in site diagrams;
- ☐ location and operating parameters of equipment shown in certification documents;
- ☐ compliance of equipment location;
- ☐ compliance of wiring systems; and
- ☐ alignment of hazardous areas documentation to as- built installation.
- ☐ Reporting non-conformance of an installation.

BAE 635 Testing in Hazardous Areas

UEENEEM039A Conduct testing of hazardous areas installations - gas

Atmospheres

KS01-EM03

9A

Hazardous area installations testing

Evidence shall show an understanding of hazardous area installations testing to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

- ☐ Purpose and scope of certification schemes.
- ☐ Schemes accepted in Australia and New Zealand.
- ☐ Schemes commonly used in countries other than Australia and New Zealand.
- ☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits

protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).

☐ Typical situations where the Non-sparking explosion-protection technique is

used;

☐ Actions or conditions that would void the protection provided the

Non-sparking technique; and

☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).

☐ Typical situations where the Intrinsic safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Intrinsic safety;

☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in

hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;
- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T13 Terminating cables suitable for use in hazardous areas encompassing:

☒ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)

☒ terminating a cable with a barrier gland. (Gases only.)

☒ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.

☒ testing termination/connections of installed cables/circuits.

T14 Preparation for conducting installation testing in a hazardous area encompassing:

☒ OHS procedures to be followed for working in a hazardous area; and

☒ procedures for determining whether a given hazardous area is safe to conduct electrical testing.

T15 Characteristics and limitations of testing equipment used to test installation in hazardous areas encompassing:

☒ testing devices required to test an installation in a hazardous area; and

☒ the suitability of testing device for use in a hazardous area.

T16 Documentation of results of hazardous area installation tests encompassing:

☒ test results that should be recorded in a verification dossier; and

☒ procedures and options for dealing with test results that show non-conformance.

UEENEEM052A Classify hazardous areas - gas atmospheres

KS01-EM052A Hazardous areas classification

Evidence shall show an understanding of processes involved in gathering and analysing technical data to classify non-specific hazardous areas. The following aspects indicate the extent of understanding required.

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

- ☐ the main features and purpose of a 'clearance to work' system (includes hot work permit systems).
- ☐ typical safety procedures that should be followed before entering a hazardous area;
- ☐ the purpose of gas detectors and their limitations;
- ☐ effects of temperature on gas and vapour detection;
- ☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature rise;
- ☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;
- ☐ safety in use of gas detectors, for example, 'read and run concept'
- ☐ the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas encompassing:

- ☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and
- ☐ the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers of explosion-protected equipment; designated authorities; insurers.

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

- ☐ condition in the workplace that will lead to an explosion;
- ☐ the terms 'combustion', 'ignition' and 'propagation';
- ☐ explosive range of substances encountered in the workplace i.e. LEL/UEL;
- ☐ explosive parameters of substances as given in tables of substance properties

Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.

- ☐ the difference between gases and vapours; and
- ☐ the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

- ☐ the Standards definition of a 'hazardous area';
- ☐ the recommended methods for classifying the type and degree of explosion hazard in an area;
- ☐ hazardous area classifications as defined by Standards; and
- ☐ factors that are considered when a hazardous area is classified.
- ☐ the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 The process of classifying hazardous areas encompassing:

- ☐ methods by which an area can be classified;
- ☐ the characteristics/attributes of an area that should be considered in the classification process, for example, type of process, nature of plant, source and nature of release;
- ☐ the requirements and Standards for classifying a hazardous area; and
- ☐ the responsibilities of the owner/occupiers for classification of a hazardous area.

T6 The likelihood (zoning) or risk assessment method of an explosive hazard encompassing:

- ☐ ignition properties of materials relevant to determining the likelihood and extent of

an explosive hazard;

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

☐ methods for assessment and calculation of factors such as release rate , ventilation and dispersion characteristics; and and

☐ means for reducing hazard risk.

T7 The extent of an explosive hazard and classifying an area accordingly encompassing:

☐ 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; and

☐ the extent of the zones, temperature classes and gas groups on site drawings in a hazardous area.

BAE 636 Inspection in Hazardous Area

UEENEEM078A Manage compliance of hazardous areas

KS01-EM078A Hazardous areas compliance requirements

Evidence shall show an understanding of hazardous areas compliance requirements to an extent indicated by the following aspects:

T1 Occupational Health and Safety responsibilities related to hazardous areas encompassing:

☐ the main features and purpose of a 'clearance to work' system (includes hot work permit systems).

☐ typical safety procedures that should be followed before entering a hazardous area;

☐ the purpose of gas detectors and their limitations;

☐ effects of temperature on gas and vapour detection;

☐ frequency of monitoring for presence of gas or vapours, i.e. effects of temperature

rise;

☐ factors affecting the accuracy of gas detectors, for example, contamination, condensation, temperature;

☐ safety in use of gas detectors, for example, 'read and run concept' the safety precautions to be taken when working in a hazardous area.

T2 The roles of the parties involved in the safety of hazardous areas encompassing:

☐ common 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 assist persons with hazardous area responsibilities, for example, Standard bodies, experienced consultants; and

☐ the hazardous area responsibilities of the owner of premises in which a hazardous area exists; the occupier of premises in which a hazardous area exists; enterprises and personnel engaged in installation and/or maintenance of explosion-protection systems; enterprises and personnel engaged in the classification of hazardous areas and/or design of explosion-protection systems; enterprises and personnel engaged in the overhaul, modification and/or assessment of explosion-protected equipment; enterprises and personnel engaged in the inspection of explosion-protection installations; manufacturers of explosion-protected equipment; designated authorities; insurers.

T3 Properties of combustible substances and their potential to create an explosive hazard encompassing:

☐ condition in the workplace that will lead to an explosion;

☐ the terms 'combustion', 'ignition' and 'propagation';

☐ explosive range of substances encountered in the workplace i.e. LEL/UEL;

☐ explosive parameters of substances as given in tables of substance properties

Note: Combustible materials are gases, vapours (from liquids), and dusts; flash point.

- ☐ the difference between gases and vapours; and

- ☐ the toxic nature of gases and vapours and potential harmful consequences.

T4 The nature of hazardous areas encompassing:

- ☐ the Standards definition of a 'hazardous area';

- ☐ the recommended methods for classifying the type and degree of explosion hazard in an area;

- ☐ hazardous area classifications as defined by Standards; and

- ☐ factors that are considered when a hazardous area is classified.

- ☐ the basics of how explosion-protection is achieved by the methods of exclusion, containment, energy limitation, dilution, avoidance of ignition source.

T5 The responsibilities of a person managing activities or a site related to a hazardous area, encompassing:

- ☐ OHS procedures that are to be established;

- ☐ responsibilities for ensuring that a hazardous area is safe; and

- ☐ responsibilities and processes for establishing and maintaining a verification dossier.

T6 Explosion-protection strategies in relation to a hazardous area, encompassing:

- ☐ the process of classifying a hazardous area;

- ☐ various ways in which electrical systems /apparatus can be treated to prevent them from becoming an ignition source; and

- ☐ the cost of the different ways of treating electrical systems/apparatus associated with hazardous areas.

T7 Requirements for the maintenance of electrical systems associated with hazardous areas, encompassing:

- ☐ the type and grades of inspection of hazardous areas;

- ☐ maintenance programs for electrical explosion-protected systems/apparatus; and

documentation requirements associated with maintenance procedures.

UEENEEM042A Conduct visual inspection of hazardous areas installations

KS01-EM04

2A

Hazardous areas visual inspection

Evidence shall show an understanding of the purpose and process of hazardous areas visual inspections to an extent indicated by the following aspects:

T1 Occupational, health and safety procedures encompassing:

☐ occupational, health and safety procedures to be followed before entering hazardous areas; and

occupational, health and safety procedures to be followed while conducting visual inspection.

T2 Requirements for a verification dossier and relationship to as-built electrical installation.

T3 Purpose, scope and limitations of visual inspections.

T4 Documentation requirements resulting from a visual inspection.

UEENEEM044A Conduct detailed inspection of hazardous areas installations - gas atmospheres

KS01-EM044

A

Hazardous areas detailed inspection techniques

Evidence shall show an understanding of hazardous areas detailed inspection techniques to an extent indicated by the following aspects:

T1 Explosion-protection equipment — Ex certification schemes encompassing:

☐ Purpose and scope of certification schemes.

☐ Schemes accepted in Australia and New Zealand.

☐ Schemes commonly used in countries other than Australia and New Zealand.

☐ Processes for having equipment certified under the acceptable Ex schemes — scheme procedures; quality management requirements; conformance testing and assessment; and requirements for ongoing certification.

T2 Flameproof (Ex 'd') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the flameproof (Ex 'd') technique. (Examples of characteristics and design features are flame paths, integrity under pressure, pressure piling, and enclosure entries).

☐ Typical situations where the flameproof explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Flameproof technique;

☐ The use of Standards in determining the requirements to which the installation of flameproof explosion-protected apparatus shall comply.

T3 Increased safety (Ex 'e') explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Increased safety (Ex 'e') technique (Examples of characteristics and design features are temperature rise, maximum power dissipation, protection devices, certified components, creepage and clearance distances, absence of sparking contacts and enclosure entries).

☐ Typical situations where the Increased safety explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the Increased safety technique;

☐ The use of Standards in determining the requirements to which the installation

of Increased safety explosion-protected apparatus shall comply.

T4 Non-sparking (Ex 'n') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Non-sparking (Ex 'n') technique (Examples of characteristics and design features are creepage and clearance distances and restricted breathing).
- ☐ Typical situations where the Non-sparking explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Non-sparking technique; and
- ☐ The use of Standards in determining the requirements to which the installation of Non-sparking explosion-protected apparatus shall comply.

T5 Intrinsic safety (Ex 'i') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits protected by the Intrinsic safety (Ex 'i') technique (Examples of characteristics and design features are field devices, cables, safe area devices, earthing, entity versus integrated system concept, simple devices and interface devices and their parameters, segregation, infallible components, current and voltage limiting, creepage and clearance distances).
- ☐ Typical situations where the Intrinsic safety explosion-protection technique is used;
- ☐ Actions or conditions that would void the protection provided the Intrinsic safety;
- ☐ The use of Standards in determining the requirements to which the installation of Intrinsic safety explosion-protected apparatus shall comply.

T6 Pressurization (Ex 'p') explosion-protection technique encompassing:

- ☐ The purpose and characteristics of the design features of apparatus and circuits

protected by the Pressurization (Ex 'p') technique (Examples of characteristics and design features are exclusion and dilution; purge periods, controlled shut down, monitoring and sources of internal release).

☐ Typical situations where the pressurization explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the pressurization technique;

☐ The use of Standards in determining the requirements to which the installation of pressurization explosion-protected apparatus shall comply.

T7 Enclosures for dusts (Ex 'tD') - explosion-protection technique encompassing:

☐ The purpose and characteristics of the design features of apparatus and circuits protected by the techniques for dusts (Examples of characteristics and design features are for enclosures; pressurization; encapsulation; and intrinsic safety).

☐ Typical situations where the each dust explosion-protection technique is used;

☐ Actions or conditions that would void the protection provided the each dust technique;

☐ The use of Standards in determining the requirements to which the installation of dust explosion-protected apparatus shall comply.

REQUIRED SKILLS AND KNOWLEDGE

T8 Common characteristics of explosion-protection techniques encompassing:

☐ The purposes of 'temperature classification' and 'gas grouping/apparatus grouping'.

☐ Compliance plate markings.

☐ Limitations of non-metallic or specific alloy enclosures.

☐ The purpose of conformity and certification/approval for equipment used in hazardous areas.

☐ Environmental conditions that may impact on explosion-protection techniques.

☐ The principles and applications of other and mixed explosion-protection techniques (Other techniques include encapsulation Ex 'm'; oil-immersion Ex 'o'; powder-filling Ex 'q', ventilation Ex 'v' and special protection Ex 's').

☐ Features and purpose of conduit seals and cable termination devices designed for use in hazardous areas (These include conduit seals and barrier and compression glands for cables with or without armouring, screening and/or drain wires).

T9 Preparation to install and maintain explosion-protected equipment in hazardous areas encompassing:

- ☐ OHS procedures to be followed when working in a hazardous area;
- ☐ the significance of information provided on the certification documentation and schedules for a given item of explosion-protected equipment;
- ☐ the typical contents of a verification dossier and their purpose; and
- ☐ limitations in the use of tools and testing devices in hazardous areas.

T10 The relationship between explosion-protected equipment, their certification documents and required locations given in specifications and layout drawings and/or written instructions encompassing:

- ☐ the purpose of markings on the compliance plate and certification documents for a given item of explosion-protected equipment;
- ☐ matching explosion-protected equipment with certification documents and the equipment specified for an installation; and
- ☐ the location the items of explosion-protected equipment for an installation from specifications and layout drawings and/or instructions.

T11 Installation Standards and requirements applicable to hazardous encompassing:

- ☐ the wiring systems permitted and not permitted in or above hazardous areas;
- ☐ equipment not permitted in or above hazardous areas;

- ☐ the regulations and Standards to which explosion-protected equipment and wiring must be installed in a hazardous area and how these are applied; and
- ☐ the documentation required as a record of the installation process, including certification documentation.

T12 Maintenance procedures in hazardous areas that will ensure the integrity of the explosion-protection technique encompassing:

- ☐ the purpose of a maintenance schedule;
- ☐ the purpose and extent of 'close', 'sample' and 'periodic' inspections;
- ☐ the features of each explosion-protection techniques that should be included in a maintenance schedule;
- ☐ the impact of environmental conditions on explosion-protected equipment, including corrosion and frequency of maintenance;
- ☐ the documentation requirements for recording the maintenance process and results;
- ☐ the use of Standards in determining the requirements with which the design of explosion-protected apparatus shall comply.

T13 Cable termination types suitable for use in hazardous areas encompassing:

- ☐ explosion protection features of cable terminations devices.
- ☐ selecting compliant cable termination devices.

T14 Terminating cables suitable for use in hazardous areas encompassing:

- ☐ installing conduit systems, where applicable, including seals to meet hazardous areas requirements. (Gases only.)
- ☐ terminating a cable with a barrier gland. (Gases only.)
- ☐ terminating a multipair, SWA, overall screened, individual screened cable into an enclosure.
- ☐ testing termination/connections of installed cables/circuits.

T15 The relationship between the documentation held in a verification dossier and

the installed equipment encompassing:

- ☐ consistency between the location and type of equipment with the area classification details in the verification dossier; and
- ☐ equipment certification and any attached conditions that relate to the equipment as it is installed.

T16 Inspecting a hazardous area installation encompassing:

- ☐ typical processes for undertaking the inspection of a hazardous area installation;
- ☐ requirements applicable to a given installation; and
- ☐ reporting of an inspection of a hazardous area installation.

BAE 637 Chemical Hazardous Management

1. INTRODUCTION	.....
1.1 What are hazardous chemicals?	.....
1.2 Who has health and safety duties in relation to hazardous chemicals?	.....
1.3 What is required to manage the risks associated with hazardous chemicals?	.....
1.4 Prohibited and restricted hazardous chemicals	.....
1.5 Exposure standards	.....
1.6 Preparing a register and manifest of hazardous chemicals	.....
2. IDENTIFYING HAZARDS	.....
2.1 How to identify which chemicals are hazardous	.....
2.2 Safety Data Sheets (SDS)	.....
2.3 Labels	.....
2.4 Other sources of information	.....
3. ASSESSING RISKS	.....
3.1 Decide who should do the assessment	.....
3.2 Decide what sort of risk assessment is appropriate	.....
3.3 Things to consider in assessing health risks	.....
3.4 How to assess physicochemical risks	.....
4. CONTROLLING RISKS	.....
4.1 The hierarchy of control	.....
4.2 <i>Specific control</i> measures	.....
4.3 Maintaining control measures	.....
4.4 Providing information, training, instruction and supervision	.....
5. MONITORING AND REVIEW	.....
5.1 Health monitoring	.....
5.2 Reviewing control measures	.....
6. EMERGENCY PREPAREDNESS	.....
6.1 Emergency plan	.....
6.2 Emergency equipment and safety equipment	.....

6.3 Fire protection systems
6.4 Monitors and alarms
6.5 Automatic sprinkler systems
6.6 Water supply

BAE 638 Environmental Engineering in Hazardous Areas

HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

NOISE

SOCIOECONOMICS

TRANSPORTATION

UTILITIES

ENVIRONMENTAL JUSTICE

SUBSISTENCE

Mercury in the Environment

Health Hazards

MINE HEALTH AND SAFETY ACT

PIPELINE SAFETY REGULATIONS