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Functional Flowchart

Not Applicable.

Objective

To provide a corporate standard that outlines SCL's procedure for managing hazards associated with hazardous areas.

Scope

This corporate standard applies to SCL owned locations that are classified as hazardous areas, or any situation in which a person is required to enter or work in a hazardous area operated and maintained by SCL.

Definitions

Area: A three-dimensional region or space.

Classification of Hazardous Areas: Is a method of analysing and classifying the environment where an explosive atmosphere is present or is expected to be present. This allows the proper selection of equipment, particularly electrical equipment, to be installed or used in that environment. Area classification is actioned in the following way:

- the type of hazard is defined (i.e. gas or dust or a combination of gases and dusts).
- the probability of an explosive atmosphere actually occurring is assessed (release frequency and duration (i.e. continuous, primary or secondary grade of release)).

Combustible dust: Dust that can burn or glow in air and could form explosive mixtures with air at atmospheric pressure and normal temperatures. Combustible dusts include dusts, fibres and flyings.

Competent person: A person who has through a combination of training, education and experience, acquired knowledge and skills enabling that person to perform correctly the specified task. Refer [Training and Competency](#).

Dust: Small solid particles in the atmosphere which settle out under their own weight, but which may remain suspended in air for some time.

Ex: equipment. The letter following Ex refers to:

- D – flame proof
- E - increased safety
- i - intrinsically safe
- n - nonsparking.

Explosive atmosphere: Mixture with air under atmospheric conditions, of flammable materials in the form of gas, vapour, mist, dust or fibres in which, after ignition, combustion spreads throughout the unconsumed mixture.

Explosion protection: Specific measures applied to electrical equipment to avoid ignition of a surrounding explosive atmosphere.

Flammable gas or vapour: Gas or vapour which, when mixed with air in certain proportions, will form an explosive gas atmosphere.

Flammable liquid: Any Class 3.1 or Class 3.2 liquid having a flashpoint of not more than 61°C.

Flammable material: Gas, vapour, liquid, dust or solid which can react continuously under appropriate concentration conditions with atmospheric oxygen and which may therefore sustain fire or explosion when such reaction is initiated by a suitable spark, flame or hot surface.

Note: Many liquids and solids, though regarded as flammable, nevertheless do not normally burn. The application of heat to such materials serves to release vapour, which may burn with atmospheric oxygen. The heat of the subsequent reaction serves to release further vapour for combustion. Flame may propagate throughout suspensions of dusts by this mechanism.

Flyings: Airborne particles.

- Hazardous area:** An area in which an explosive atmosphere is present or may be expected to be present, in quantities such as to require special precautions for:
- any access or activity that presents an ignition source;
 - the construction, installation, testing, inspection and use of electrical equipment;
 - installing mechanical equipment. (there are no standards yet that directly govern the installation of mechanical equipment within a hazardous area i.e. air compressors, conveyor systems).

Hot work: Welding, thermal, friction or oxygen cutting, grinding, heating and other fire-producing or spark-producing operations that may increase the risk of fire or explosion.

Ignition source: Source of energy, which may comprise of naked flames, sparks or hot surfaces / particles, sufficient to ignite an explosive atmosphere.

Examples of typical sources of ignition from electrical systems and apparatus include:

- electrical arcing / sparking when circuits are switched by devices such as motor contactors, auxiliary relays, switches and contacts; and
- hot surfaces produced by motors, relay coils, transformers, ballasts, hot joints, cables, light globes, etc.

Intrinsically safe: a device termed intrinsically safe is designed to not contain any components that produce sparks or which can hold enough energy to produce a spark of sufficient energy to cause an ignition.

Thermite reaction: an aluminothermic reaction in which aluminium metal is oxidised by the oxide of another metal, most commonly iron oxide.

Worker: SCL employee or controlled contractor.

Zone 0: An area in which an explosive gas atmosphere is present continuously, or is present for long periods. Examples may include the vapour space of vented vessels, vapour space of vented storage tanks and immediately adjacent to a continuous source of release.

Zone 1: An area in which an explosive gas atmosphere is likely to occur in normal operation. Examples may include where pumps are liable to leak under normal conditions, or where vents, relief valves or sample points are likely to release vapour into the atmosphere.

Zone 2: An area in which an explosive gas atmosphere is not likely to occur in normal operation and if it does occur it will exist for a short period only. Examples may include where vessels, pumps, compressors and pipes containing flammable gases and liquids are constructed and maintained to prevent leakage under normal operating conditions.

Zone 20: An area in which combustible dust, as a cloud, is present continuously or frequently, during normal operation, in sufficient quantity to be capable of producing an explosive concentration of combustible dust mixed with air, and / or where layers of dust of uncontrollable and excessive thickness can be formed.

Zone 21: An area not classified as zone 20 in which combustible dust, as a cloud, is likely to occur during normal operation, in sufficient quantities to be capable of producing an explosive concentration of combustible dust mixed with air.

Zone 22: Areas not classified as zone 21 in which combustible dust clouds may occur infrequently, and persist for only a short period, or in which accumulations or layers of combustible dust may be present under abnormal conditions and give rise to combustible mixtures of dust in air. Where, following an abnormal condition, the removal of dust accumulations or layers cannot be assured then the area is to be classified zone 21.

Responsibilities

OH&S Systems Manager

To maintain the currency and accuracy of the Hazardous Areas Corporate Standard reflective of legislative and corporate change.

Station / Site Manager

To monitor the implementation of the Hazardous Areas Corporate Standard and allocate responsibilities and resources to ensure site-specific practices/procedures are developed to satisfy the Corporate Standard.

Workers (SCL Employees and Controlled Contractors)

To comply at all times with the requirements specified within this Corporate Standard and any site-specific procedures.

Hazards

A safe system has been implemented to control risks to health and safety arising from hazards / issues such as, but not limited to:

- ignition sources;
- fire; and
- explosion.

Controls

Design

1. The design of plant and installations in which flammable and / or combustible materials are to be handled or stored are to be kept to a minimum.

Electrical Apparatus and Equipment

2. Electrical apparatus to be installed in a hazardous area is to be located outside the hazardous area. If this is not practicable, the electrical apparatus is to be placed in the least hazardous location.
3. The selection, installation, maintenance and inspection of electrical equipment for use in hazardous areas, is to be in accordance with the applicable Australian Standards as cited in [Links and References](#).

Classification of Hazardous Areas

4. Hazardous areas are to be classified into specific 'Zones', depending on the nature of the explosive atmosphere present.
5. Classification is to be undertaken by a competent person (usually an external organisation / auditor) who has received training in accordance with Joint Series of Competency Standards - AS/NZS 4761- Competencies for working with electrical equipment for hazardous areas (EEHA). Refer [Training & Competency](#) section.

General

6. The following equipment may act as an ignition source, and as such, is NOT permitted in hazardous areas (not inclusive):
 - combustion engines;
 - mobile phones;
 - hearing aids;
 - key-ring torches;
 - calculators;

- + +
 - car keys with automatic door locking features;
 - +
 - pagers;
 - watches;
 - transistor radios and communication radios;
 - +
 - battery chargers with their control equipment and batteries being charged (unless suitable for the hazardous area);
 - +
 - lasers;
 - low pressure sodium vapour discharge lamps;
 - nylon and other synthetic clothing; and
 - other sources of static electricity.
7. Equipment to be taken into a hazardous area is to be rated as explosion protected and/or intrinsically safe. Non-certified / non-explosion protected portable equipment (e.g. welding equipment) is only to be taken / used in a hazardous area if the work method statement indicates that it is safe to do so, and suitable additional controls have been implemented. Non-sparking hand tools (e.g. beryllium) are to be used.
 8. Alloy tools, scaffolding or ladders striking rusty metal, or rusty tools striking a light alloy could produce a thermite reaction and hence lead to an explosion in a hazardous area.
 9. Battery operated vehicles (e.g. fork lifts), to be used in a hazardous area are to be in accordance with AS 1915 – Electrical apparatus for explosive atmospheres – Battery operated vehicles.
 10. Prior to commencing hot work activities in a hazardous area, a Hot Work Control Guide is to be completed in accordance with [HBIRDPRO-#560724-Hot Work](#).

Signage

11. Hazardous areas are to be clearly defined and marked / signed in accordance with AS 1319 - *Safety Signs for the Occupational Environment*.
12. Signage for a hazardous area is to:
 - identify the nature / type of hazardous area (e.g. gas or dust hazardous area), and
 - specify requirements / precautions whilst in the hazardous area (e.g. signage is to identify equipment which is not permitted in the hazardous area).

Note: Refer [HBIRDPRO-#570000-Safety Signs](#)

Site Specific Management

13. A Verification Dossier, which contains:
 - all classification documents;
 - risk assessments (not Work Method Statements);
 - equipment classification certificates;
 - inspection reports;
 - completed [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Maintenance and Repair Work Report.dot](#) drawings; and
 - justifications etc., relating to the hazardous area(s), is to be kept / maintained.
14. The Verification Dossier is to be readily available to all persons required to enter and / or work in the hazardous area(s).

++ *Inspections and Maintenance*

- + 15. All explosion-protected ignition sources located in hazardous areas, are to be regularly inspected and maintained by a competent person. Refer [Training and Competency](#).
- + 16. A 4 yearly inspection process is to be implemented for classified hazardous area plant using the following check sheets where relevant:
 - + [T:\Templates\OH&S – Occupational Health & Safety\Hazardous Area Check Sheet Equipment In Combustibles Dust Areas.dot](#)
 - + [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Flameproof Ex d.dot](#)
 - + [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Increased Safety Ex e.dot](#)
 - + [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Intrinsically Safe Ex i.dot](#)
 - + [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Non-Sparking Ex n.dot](#)
- 17. Where maintenance or repair is undertaken for electrical equipment, [T:\Templates\OH&S - Occupational Health & Safety\Hazardous Area Maintenance and Repair Work Report.dot](#) is to be completed.
- 18. Completed forms are to be filed in the Verification Dossier.

Training and Competency

- 19. All persons (including contractors) who are expected to, or who may enter a hazardous area for any purpose, are to have first received appropriate training / instruction in relation to the necessary precautions, particularly the need to ensure that no potential ignition sources are taken into the hazardous area. Refer [HBIRDPRO-#551042-Hazardous Area Awareness Training - HS043](#)

Note: This training / instruction may be incorporated into the site induction process.

- 20. No worker is to undertake any hot work activities within a hazardous area unless they have received appropriate training as per [HBIRDPRO-#551027-HEHI Hot Work - HS021](#).
- 21. Authorised electrical workers, technicians and engineers who install, maintain, inspect or test electrical equipment in a hazardous area are to receive training as per [HBIRDPRO-#550995-Hazardous Area Training 1 - Installation and Maintenance of Electrical Equipment - HS072](#). Refresher training is to be provided as per [HBIRDPRO-#1163666-Hazardous Area Training 1-Installation and Maintenance of Electrical Equipment Refresher](#)
- 22. Persons who are required to carry out design for explosion protected and associated electrical equipment in hazardous area installations are to receive training as per [HBIRDPRO-#1132859-Hazardous Area Training 2 - Design of Electrical Installations](#). Refresher training is to be provided as per [HBIRDPRO-#1163662-Hazardous Area Training 2 - Design of Electrical Installations Refresher](#).
- 23. Persons who develop maintenance management programs for hazardous area installations are to receive training as per [HBIRDPRO-#1150914-Hazardous Areas Training 3 - Maintenance Management of Electrical Equipment](#).

Review

This corporate standard is reviewed every 3 years and on an as needs basis (e.g. following legislative change, new information, relevant incident, etc.).

Links and References

[HBIRDPRO-#692251-HOT WORK](#)

[HBIRDPRO-#570000-Safety Signs](#)

[HBIRDPRO-#562514-Welding](#)

[T:\Templates\OH&S - Occupational Health & Safety\PTW Hot Work Control Guide.dot](#)

[T:\Templates\OH&S - Occupational Health & Safety\ATW Hot Work Control Guide.dot](#)

[OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Equipment In Combustibles Dust Areas](#)

[OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Flameproof Ex d](#)

[OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Increased Safety Ex e](#)

[OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Intrinsically Safe Ex i](#)

[OH&S - Occupational Health & Safety\Hazardous Area Check Sheet Non-Sparking Ex n.](#)

[HBIRDPRO-#623734-Hazardous Areas Awareness Training](#)

[HBIRDPRO-#550995-Hazardous Area Training 1 – Installation and Maintenance of Electrical Equipment - HS072](#)

[HBIRDPRO-#1163666-Hazardous Area Training 1-Installation and Maintenance of Electrical Equipment Refresher](#)

[HBIRDPRO-#1132859-Hazardous Area Training 2 - Design of Electrical Installations](#)

[HBIRDPRO-#1163662-Hazardous Area Training 2 - Design of Electrical Installations Refresher](#)

[HBIRDPRO-#1150914-Hazardous Areas Training 3 - Maintenance Management of Electrical Equipment](#)

[HBIRDPRO-#551027-HEHI Hot Work - HS021](#)

QLD

Electrical Safety Act 2002

QLD

Electrical Safety Regulation 2002, Part 8, Division 1 & Section 153

AS 1319:1994

Safety Signs for the Occupational Environment

AS 1482:1985

Electrical equipment for explosive atmospheres – Protection by Ventilation – Type of Protection v

AS 1915:1992

Electrical apparatus for explosive atmospheres – Battery-operated vehicles

AS 2380 Series

Electrical equipment for explosive atmospheres

AS/NZS 2381 Series

Electrical equipment for explosive atmospheres

AS/NZS 2430 Series

Classification of hazardous areas

AS/NZS 3000:2007

Wiring Rules

AS/NZS 3800:2005

Electrical equipment for explosive atmospheres – Repair and overhaul

AS/NZS 4761.1:2008

Competencies for working with electrical equipment for hazardous areas (EEHA)

AS/NZS 61241 Series

Electrical apparatus for use in the presence of combustible dust

AS/NZS 60079 Series

Electrical apparatus for explosive gas atmospheres

HB 13:2007

Electrical equipment for hazardous areas – TAFE NSW Technical and Further Education – Manufacturing and Engineering Education Services Division

Attachments

[Attachment 1: Audit Checklist](#)

[Return To Top](#)

Corporate Standard

Hazardous Areas

HB# 625195

Amd Date 14/05/09

Attachment 1: Audit Checklist

1. Refer Word SCL Templates/Corporate Management/Audit Report Template for further explanation of Risk Levels/Root Causes.
2. Complete page 1 of the Audit Report Template when the findings are to be entered into the ARD and combine with this table.
3. Save completed document to Hummingbird/Corporate Management/Audit.

ARD ID#	SHORT TITLE	STANDARD / OBLIGATION BEING AUDITED AND FINDING	RECOMMENDATION	RECOMMEND'N CLASSIFICATION	TARGET DATE	ACTION OFFICER	APPROVING OFFICER	GM	RISK LEVEL /ROOT CAUSE
Controls - Classification									
		Has a site assessment been undertaken and hazardous areas identified by a competent person? Check reports, verification dossier etc.		Please select:					RL: RC:
		Are Hazardous areas classified by a competent person? Review person / companies credentials / qualifications.		Please select:					RL: RC:
Controls – General, Signage									
		Is there a process in place to ensure equipment taken into a hazardous area is rated as explosion protected / intrinsically safe?		Please select:					RL: RC:
		Are non-sparking hand tools available and used? Check tools available.		Please select:					RL: RC:

Corporate Standard

Hazardous Areas

HB# 625195

Amd Date 14/05/09

ARD ID#	SHORT TITLE	STANDARD / OBLIGATION BEING AUDITED AND FINDING	RECOMMENDATION	RECOMMEND'N CLASSIFICATION	TARGET DATE	ACTION OFFICER	APPROVING OFFICER	GM	RISK LEVEL /ROOT CAUSE
		<p>Are hazardous areas clearly marked / signed in accordance with AS1319?</p> <p>Signage meets the following:</p> <ul style="list-style-type: none"> - Identifies the nature/type of hazardous area? - specifies all necessary requirements / precautions to be adhered to? <p>Identifies equipment which is not permitted in the area?</p>		Please select:					RL: RC:
		Are Hot Work Control Guides completed for hot work in hazardous areas?		Please select:					RL: RC:
		Are battery operated vehicles to be used in a hazardous area in accordance with AS1915?		Please select:					RL: RC:
		<p>Is there a process in place to ensure electrical equipment in hazardous areas in accordance with applicable Australian Standards?</p> <p>Refer design criteria, consultant reports etc.</p>		Please select:					RL: RC:
Site Specific Management									
		<p>Is a hazardous area Verification Dossier kept / maintained?</p> <p>Check contents as per Std.</p>		Please select:					RL: RC:

Corporate Standard

Hazardous Areas

HB# 625195

Amd Date 14/05/09

ARD ID#	SHORT TITLE	STANDARD / OBLIGATION BEING AUDITED AND FINDING	RECOMMENDATION	RECOMMEND'N CLASSIFICATION	TARGET DATE	ACTION OFFICER	APPROVING OFFICER	GM	RISK LEVEL /ROOT CAUSE
		Is the Verification Dossier readily available to all persons required to enter and / or work in the hazardous area(s)?		Please select:					RL: RC:
		Are explosion-protected ignition sources regularly inspected, maintained by a competent person and records kept?		Please select:					RL: RC:
		<p>Are 4 yearly inspection processes implemented for classified hazardous area plant where relevant?</p> <ul style="list-style-type: none"> ▪ Hazardous Area Check Sheet Equipment In Combustibles Dust Areas ▪ Hazardous Area Check Sheet Flameproof Ex d ▪ Hazardous Area Check Sheet Increased Safety Ex e ▪ Hazardous Area Check Sheet Intrinsically Safe Ex i ▪ Hazardous Area Check Sheet Non-Sparking Ex n <p>Review Verification Dossier.</p>		Please select:				RL: RC:	
		Where maintenance or repair is undertaken for electrical equipment is SCL Form: Hazardous Area Maintenance and Repair Work Report completed?		Please select:					RL: RC:

Corporate Standard

Hazardous Areas

HB# 625195

Amd Date 14/05/09

ARD ID#	SHORT TITLE	STANDARD / OBLIGATION BEING AUDITED AND FINDING	RECOMMENDATION	RECOMMEND'N CLASSIFICATION	TARGET DATE	ACTION OFFICER	APPROVING OFFICER	GM	RISK LEVEL /ROOT CAUSE
		Review Verification Dossier							
Training and Competency									
		<p>Have authorised electrical workers, technicians and engineers who install, maintain, inspect or test electrical equipment in a hazardous area received training as per HBIRDPRO-#550995-Hazardous Area Training 1 - Inspection and Maintenance of Electrical Equipment - HS072.</p> <p>Has refresher training been provided as per HBIRDPRO-#1163666-Hazardous Area Training 1-Installation and Maintenance of Electrical Equipment Refresher</p> <p>Refer training database.</p>		Please select:					RL: RC:
		<p>Have persons who are required to carry out design for explosion protected and associated electrical equipment in hazardous area installations received training as per HBIRDPRO-#1132859-Hazardous Area Training 2 - Design of Electrical Installations</p> <p>Has training been provided as per HBIRDPRO-#1163662-</p>		Please select:					RL: RC:

Corporate Standard

Hazardous Areas

HB# 625195

Amd Date 14/05/09

ARD ID#	SHORT TITLE	STANDARD / OBLIGATION BEING AUDITED AND FINDING	RECOMMENDATION	RECOMMEND'N CLASSIFICATION	TARGET DATE	ACTION OFFICER	APPROVING OFFICER	GM	RISK LEVEL /ROOT CAUSE
		Hazardous Area Training 2 - Design of Electrical Installations Refresher. Refer training database.							
		Have persons who develop maintenance management programs for hazardous area installations received training as per HBIRDPRO-#1150914-Hazardous Areas Training 3 - Maintenance Management of Electrical Equipment. Refer training database.		Please select:					RL: RC:
		Have other persons required to enter a hazardous area have received training / instruction as per HBIRDPRO-#551042-Hazardous Area Awareness Training - HS043. Refer training database.		Please select:					RL: RC:

Further Information:

Completed by (print name):

Date:

Entered into ARD:

Name:

Signature:

Date: