This guidance provides information for employers and operators of major hazard facilities (MHFs) on the safe management of electrical equipment in hazardous areas (EEHA) at MHFs.

**Background**

WorkSafe has taken enforcement action in relation to multiple instances of poor management of EEHA at MHF sites. Poor EEHA management is a potential precursor to a major incident. Observed failures have included:

- EEHA inspections not conducted to an appropriate periodic inspection regime derived from a Risk Based Inspection (RBI) methodology or as stated in AS/NZS 60079.17:2009 Explosive atmospheres Part 17: Electrical installations inspection and maintenance.
- Damaged electrical equipment in hazardous areas not repaired or replaced once defects are identified.
- Electrical equipment installations in hazardous areas not appropriate for the area in which it is located.
- Duty holders unable to demonstrate that electrical equipment is appropriate for the hazardous zoned area in which it is installed.
- Relevant documents unavailable, such as electrical verification dossiers and hazardous zone maps.

**What is a Hazardous Area?**

As defined in AS/NZS 60079.0, a ‘hazardous area’ is 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 the construction, installation, and use of potential ignition sources’.

There is the potential for an explosive or flammable atmosphere to be present where flammable or combustible materials are produced, handled or stored. In these areas it is critical that sources of ignition, such as electrical equipment, are controlled to reduce the risk of an explosion or fire occurring.

**Legal duties**

Employers must, so far as is reasonably practicable, provide and maintain a working environment for their employees (including contractors) that is safe and without risks to health.

The operator of a MHF must establish and implement a Safety Management System for the MHF, which is used as the primary means of ensuring the safe operation of the MHF.

Where it is necessary to use electrical equipment in a hazardous area, special precautions need to be taken in the design, construction, selection, installation and maintenance of such equipment. Failure to manage EEHA in accordance with the OHS Act and regulations and relevant Australian Standards, such as AS/NZS 3000 The Wiring Rules and the AS/NZS 60079 series of standards, may result in a contravention of the duty holder’s OHS obligations as well as the Electricity Safety Act 1998.

Operators of MHFs also have specific obligations relating to hazardous areas under the Dangerous Goods (Storage and Handling) Regulations 2012, which require occupiers of premises where dangerous goods are stored and handled to ensure that, so far as is reasonably practicable, ignition sources are not present in any hazardous area within the premises. An ignition source includes ‘any electrical or mechanical equipment that is not specifically designed to be used in a hazardous area’.

In addition to legal duties regulated by WorkSafe, operators of MHFs have duties under the the Electricity Safety Act 1998, the Electricity Safety (Installations) Regulations 2009, which mandates compliance with the Australian/New Zealand Wiring Rules (AS/NZS 3000) and in turn the AS/NZS 60079 suite of standards. These regulations are administered by Energy Safe Victoria (ESV).
Main Stages of EEHA Management

1. Hazardous Area Classification

Responsibility for classification of a hazardous area rests with the persons in control of the electrical equipment (Clause 7.7.2.1 AS/NZS 3000). The requirements for area classification are contained in AS/NZS 60079.10.1 for gas or vapour and AS/NZS 60079.10.2 for combustible dust.

Area classification should be carried out by competent persons who have knowledge of the properties of flammable materials, the process and the equipment.

Suitably qualified persons (eg safety, electrical, mechanical and other engineering personnel) should be involved and provide advice when classifying an area. See the section below on competency of employees.

2. Selection of Equipment

Once hazardous area classification has been completed the appropriate electrical equipment can be selected for use in the hazardous areas in accordance with the AS/NZS 60079 series and AS/NZS 3000 the Wiring Rules.

For explosive gas atmospheres, three major requirements are specified for equipment to be used in areas zoned 0, 1 or 2 (refer to clause 3.6, 3.7 and 3.8 of AS/NZS60079.10.1:2009 for zone definitions):

a) The equipment complies with an appropriate explosion-protection technique for the Zone in which it is to be used (Zone and Ex classification).

b) The equipment meets the group requirements for the hazardous material(s) in which it is to be used (Group I or Group IIA, IIB or IIC).

c) The equipment has an appropriate maximum surface temperature or temperature class for the hazardous material (T classification).

Similar requirements exist for hazardous areas that contain combustible dusts. Refer to the AS/NZS 60079 series for guidance on suitable protection techniques for hazardous gas and dust areas.

3. Maintenance and Inspections

Over time, installed EEHA can degrade or become damaged. Poor maintenance can compromise the equipment's protection and introduce a source of ignition. For example, one missing bolt on the cover of a flameproof enclosure can compromise the enclosure protection and put the whole site at risk.

Duty holders must comply with AS/NZS 60079.17 as required by Victorian electricity safety legislation and to help meet their general duty under Section 21 of the OHS Act. AS/NZS 60079.17 sets out procedures for the inspection and maintenance of EEHA, to ensure that EEHA installations undergo appropriate inspections and are maintained in a satisfactory condition for continued use within hazardous areas.

The AS/NZS 60079.17 provides for three grades of inspection (Visual, Close and Detailed) and four types of inspection (Initial, Periodic, Sample and Continuous supervision). The grade of inspection and the interval between periodic inspections should be determined by taking into account the type of apparatus, manufacturer's guidelines, factors governing the equipment's deterioration, the Zone of use and the results of previous inspections. Continuous supervision by skilled personnel may be used in lieu of regular periodic inspections in line with clause 4.5 of AS/NZS 60079.17.

An inspection program should ensure that:

- Inspections are conducted in accordance with AS/NZS 60079.17
- Before any new electrical installation is brought into service it is given an initial inspection at a detailed grade.
- The interval between inspections for fixed equipment does not exceed four years without seeking expert advice and completing appropriate risk assessments.
- Defects identified in an inspection are rectified as soon as practicable.
- All inspection reports are added to the verification dossier.
- Visual or close grade periodic inspections are upgraded to detailed grade inspections if major defects are found.

[Note: OHS duties also apply to the installation of the electrical equipment after selection. For example, electrical installation work is construction work unless it only involves routine or minor testing, maintenance or repair work. Any construction work on or near an energised electrical installation is high risk construction work and a safe work method statement must be prepared and followed. Go to worksafe.vic.gov.au for further information.]
Moveable electrical equipment (hand-held, portable and transportable) is particularly prone to damage or misuse and should be submitted to a close inspection at least every 12 months. See Annex A of AS/NZS 60079.17 for a flowchart showing a typical inspection procedure for periodic inspections.

**Verification Dossier**

A 'Verification Dossier' is defined in AS/NZS 60079.14 as 'a set of documents showing the compliance of electrical apparatus and installations'. It is used for maintenance purposes and for the recording of test results, inspections, apparatus overhauls, repairs and modifications, and changes to area classifications.

A duty holder should ensure that a Verification Dossier is prepared and maintained for EEHA, and kept onsite.

A verification dossier should form part of the Safety Management System for the MHF.

The verification dossier should be used to ensure that the electrical equipment and installation techniques used are appropriate for the areas in which the equipment is installed. The dossier should include up-to-date information from all stages of the EEHA management process. The following documentation should be included:

- area classification documents
- an outline of the methods used to determine the area classification and reasoned argument for justification of any decision that might not logically align with the relevant standards and hence prove controversial
- diagrams which show zone/s, apparatus group, temperature classification and any special conditions. The diagrams should be readily available for all personnel who may be expected to carry out work in the area.
- equipment details, eg temperature ratings, type of protection, IP rating, corrosion resistance
- records sufficient to enable the explosion protected equipment to be maintained in accordance with its type of protection (see AS/NZS 60079.14), eg list and location of equipment, spares, certificates, technical information and manufacturer's instructions
- copies of previous inspection records including all test results, maintenance reports, any defects found and actions taken to correct these defects
- inspection schedule, and
- a statement of the identity of the person(s) having legal ownership of the installation or parts thereof and where the verification dossier is located.

As per Figure 1, the verification dossier should contain documentation covering all stages and activities involved in the management of hazardous areas. The Verification Dossier is a living dossier that needs to be kept up to date. Refer to the AS/NZS 60079 series more details on the expected contents of a verification dossier.
Management of Electrical Equipment in Hazardous Areas at Major Hazard Facilities

Figure 1: Documentation flow covering all functions/activities related to Hazardous Areas
(HB 13-2007 Figure 4.4, © Standards Australia Limited. Copied by Worksafe Victoria with the permission of Standards Australia under Licence 1611-c044).

- Plant design
- Area classification
- Selection of appropriate explosion-protected equipment
- Installation of selected equipment and wiring systems
- Commissioning and test verification
- Maintenance schedule
- Authorised modifications
- Hazardous areas verification dossier
- All documents for repair or overhaul and traceability
- Certified workshop and competent personnel
Competency of Employees

Employers must provide employees (including contractors for the purposes of subsections 21(1) and (2) of the OHS Act) with such information, instruction, training or supervision as is necessary to perform their work safely and without risk to health.

Employees who carry out design, construction, maintenance, testing and inspection of electrical installations in hazardous areas, are required to be competent. For the purpose of management of EEHA a competent person is someone who can demonstrate a combination of knowledge and skills to effectively, efficiently and safely carry out activities in hazardous areas.

See AS/NZS 60079.14 clause 4.4 for more information and AS/NZS 4761:2008 which sets out the general competencies required by personnel working with electrical apparatus in hazardous areas should have, and the technical training required to achieve those competencies.

Electricity Safety Management Scheme accepted by Energy Safe Victoria

A larger company may develop and use an Electricity Safety Management Schemes (ESMS) that is acceptable to Energy Safe Victoria (ESV) to fulfil its OHS duties for use of electrical equipment in a hazardous area.

The Electricity Safety Act 1998 enables a voluntary ESMS to be submitted to Energy Safe Victoria (ESV) by an employer. Refer to ESV for more details ESV also regulates the licencing of electrical workers.

Further Information

worksafe.vic.gov.au
esv.vic.gov.au

Occupational Health and Safety Act 2004
Occupational Health and Safety Regulations 2007
Electricity Safety Act 1998
Electricity Safety (Installations) Regulations 2009
Dangerous Goods (Storage and Handling) Regulations 2012
AS/NZS 3000: 2007 Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 4761.1: 2008 Competencies for working with electrical equipment for hazardous areas (EEHA) - Competency Standards
AS/NZS 60079.0 : 2012 Explosive atmospheres - Part 0: Equipment - General requirements
AS/NZS 60079.10.1: 2009 Explosive atmospheres - Classification of areas - Explosive gas atmospheres
AS/NZS 60079.10.2: 2016 Explosive atmospheres - Classification of areas - Explosive dust atmospheres
AS/NZS 60079.14: 2009 Explosive atmospheres - Electrical installations design, selection and erection
AS/NZS 60079.17: 2009 Explosive atmospheres - Electrical installations inspection and maintenance