

# MIE TALK - June 2015

## LEGISLATION ASSOCIATED WITH HAZARDOUS LOCATIONS

*OHS ACT AND REGULATIONS*



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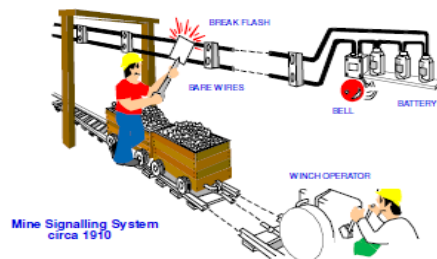
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## Introduction

All equipment installed in hazardous locations must comply with the OHS Act, Electrical Installation Regulation, Electrical Machinery Regulation 9, ARP 0108 as well as all the standards that forms part of the regulations.

Uncertified equipment is not allowed in hazardous locations as it can be a source of ignition and a danger to people and plants.



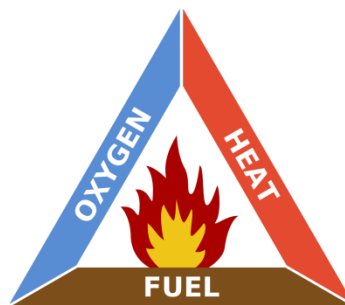
### 1. What is a hazardous Location?

An area in which an explosive gas atmosphere or combustible dust, in the form of a cloud is present, or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.

### 2. The Fire Triangle

Three components are required for an explosion or fire to occur.

- Oxygen
- Flammable Substance
- Ignition Source



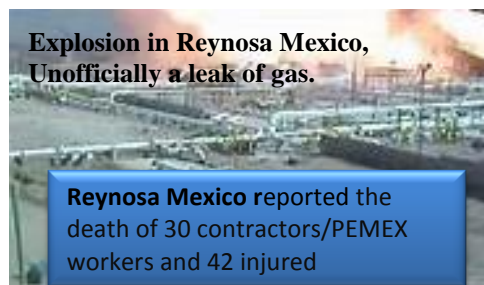
Mechanical, electrical, instrumentation and process equipment can be regarded as possible sources of ignition in potentially explosive atmospheres, as they can cause **sparks; friction** or **hot surfaces**. To

prevent sparks or hot surfaces, electrical equipment has to be design not to provide any source of ignition. This type of equipment is called **Explosion Protected Equipment**

### **Possible results from explosions, incidents and fires**

Includes:

- Loss of life
- Loss of production (Financial Impact)
- Damage to plants
- Environmental impact



### **3. Occupational Health and Safety Act. (Act 85 of 1993)**

- Act** – The Act shall refer to the latest issue of the Occupational Health and Safety Act 85/1993 (OHSA).
- Section 8** - Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.

#### **3.1 Accountability - GMR 2(1) and GMR 2(7)(a)**

- Appoint a competent person to ensure a safe and reliable work environment for all employees:
- GMR 2(1): In order to ensure that the provisions of the Act and these Regulations in relation to machinery are complied with, an employer or user of machinery shall, subject to this regulation, in writing designate a person in a full-time capacity in respect of every premises on or in which machinery is being used.
- GMR 2(7)(a): An employer or user of machinery may designate one or more competent persons to assist a person designated in terms of sub-regulation (1).

#### **3.2 Occupational Health and Safety Act, 1993 Supervision of machinery (competent person) General Machinery Regulation 2(1) - accountability**

- Appointment of GMR 2.1 that will be fully accountable for all machinery.

COMPANY NAME

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993  
SUPERVISION OF MACHINERY (COMPETENT PERSON)  
GENERAL MACHINERY REGULATION 2(1)

(Appointee's Name)

I, (Appointer's Full Name) the (Legislative reference of appointment) appointee of (Appointer's Area), hereby appoint you (Appointees Name) as the General Machinery Regulation 2(1) appointee for (Premises).

In terms of this appointment you must ensure that all machinery is in compliance with the occupational health and safety legislation, implement a planned maintenance program and ensure that the statutory machinery records are kept and maintained.

You are required to report any deviations of the legislation and above-mentioned requirements to (CEO/Section 16(2) Appointee).

Your appointment is valid from (Date).

..... (Date)  
(Appointer's Full Name) Date

Kindly confirm your acceptance of this appointment by completing the following:

ACCEPTANCE

I, (Appointee's Full Name) understand the implications of the appointment as detailed above and confirm my acceptance.

..... (Date)  
(Appointee's Full Name) Date

#### 4. Electrical Installation Regulation (EIR)

##### a. EIR 5(4) Design and construction

- i. A registered person shall exercise general control over all electrical installation work (hazardous locations) being carried out, and no person shall allow such work without such control.
- ii. "general control means"
  1. in relation to electrical installation work that is being carried out, includes instruction, guidance and supervision in respect of that work;
- iii. "registered person" means a person registered in terms of regulation 13 as an electrical tester for single phase, an installation electrician or a master installation electrician, as the case may be.
- iv. "master installation electrician" means a person who has been registered as a master installation electrician in terms of regulation 13 and who has been approved by the chief inspector for the verification and certification of the construction, testing and inspection of any electrical installation;

##### b. Electrical contractors :

- i. Registered with DOL every year.
- ii. employs a **registered person** in a **full-time capacity**, or is himself or herself a registered person

- iii. **Note:** remember the registered person must exercise general control and therefore full time on site.

**c. Identify Registered person:**

- i. registered with DOL as a Master Installation Electrician- MIE



**d. "installation work"**

- i. means the installation, extension, modification or repair of an electrical installation;
- ii. the connection of machinery at the supply terminals of such machinery; or
- iii. the inspection, testing and verification of electrical installations for the purpose of issuing a certificate of compliance;

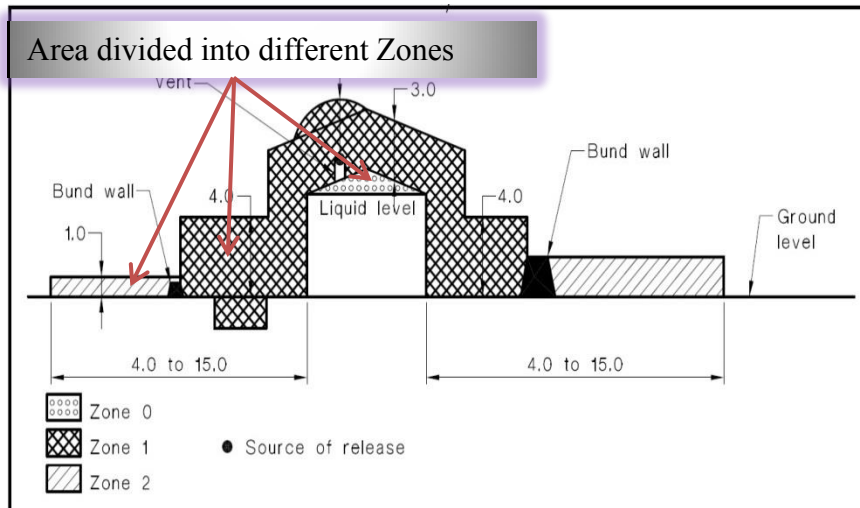
**e. "specialised electrical installations" means electrical installations in**

- i. explosive atmospheres as contemplated in SANS10086-1(SANS 60079-14, SANS 60079-17).
- ii. the petroleum industry as contemplated in SANS 1 0089-2.
- iii. hazardous locations as contemplated in SANS 10108 (SANS 60079-10-1 Gas and SANS 60079-10-2 Dust).
- iv. medical locations as contemplated in SANS1 0142-1, published by Standards South Africa; (We are going to remove medical locations from SANS 10142-1 as we are currently in the process with SANS 10142-4 specific for medical locations- )

## **5. Electrical Machinery Regulation (EMR)**

### **5.1 EMR 9(1) – SANS 10108 (SANS 60079-10-1 Gas and SANS 60079-10-2 Dust),**

- a. **EMR 9(1)** Every employer or user shall identify all hazardous locations and classify them in accordance with the relevant health and safety standard incorporated into these Regulations under section 44 of the act.
- b. Hazardous Area Classification /Map:



c. Area classification is:

- is a method of analysing and classifying the explosive environment,
- takes into account **gas groups** and **temperature classes**.
- is to facilitate proper **selection** and **installation** of apparatus to be used safely in that environment,

**Note:** Selection of Ex equipment will always follow the area classification.

## 5.2 EMR 9(2) – SANS 10108, ARP 0108

- a. **EMR 9(2)** No person may use electrical machinery in locations where there is danger of fire or explosion owing to the presence, occurrence or development of explosive or flammable articles, or where explosive articles are manufactured, handled or stored, unless such electrical machinery, **with regard to its construction relating to the classification of the hazardous** locations in which it is to be used, meets the requirements of the safety standard



*Ex certified motor*

- Equipment selection must follow the area classification
- Equipment must be appropriate to the area classification
- Type of protection – Ex d
- Gas/Dust group - IIC
- Temperature class – T3

vi. EPL – Gb

### 5.3 EMR 9(3)

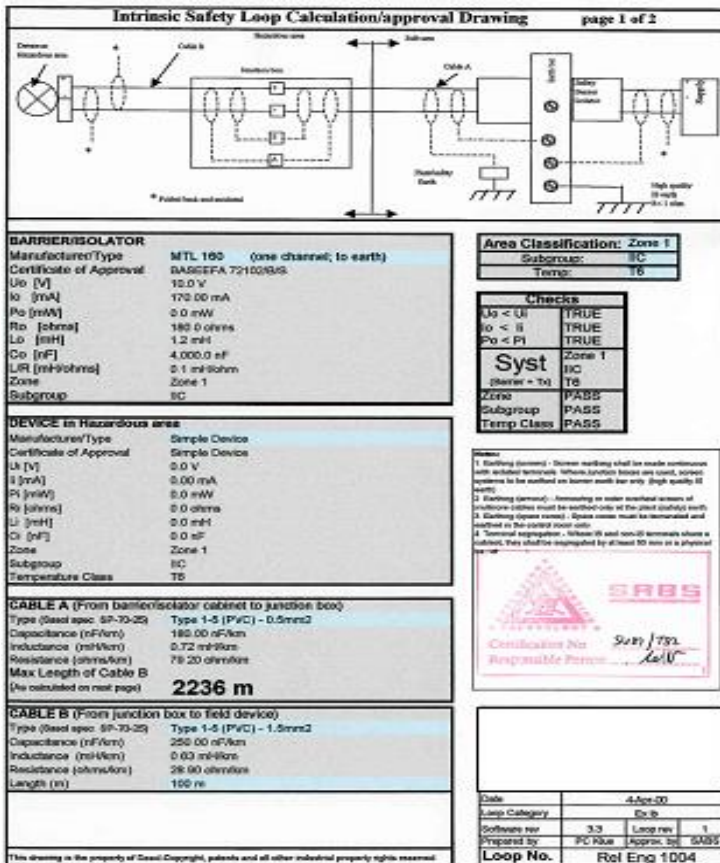
a. **The employer or user** who makes use of electrical machinery in hazardous locations **must be in possession of a certificate, which is acceptable to the chief inspector**, and which has been issued by an approved inspection authority. This certificate must certify that such electrical machinery has been **manufactured** and **tested** for the groups of dangerous articles in terms of the health and safety standards incorporated into these regulations.

- i. All Explosion Protected Equipment(EPE) must be certified by a local Accredited Approved Test Laboratory (ATL) like MASC, Explolabs etc.
- ii. All EPE must have an **Inspection Authority(IA) certificate** before any installation takes place as per ARP 0108 Annexure A.
- iii. All Intrinsically Safe loops must have a loop calculation certificate approved by an ATL before installation.

b. **Certified IS Loop Calculation/Approval drawing**

- i. IS loops can only be certified by a local Accredited Approved Test Laboratory (ATL)
- ii. Legal requirements:
- iii. IA certificate for barrier or isolator
- iv. IA certificate for device in Hazardous Area
- v. Approved calculation
- vi. Equipment installed as per calculation certificate

**vii. Certified IS loop calculation:**



**c. COC's**

- i. No person other than a registered person may issue a certificate of compliances (COC)
- ii. Every user or lessor of an electrical installation, as the case may be, shall have a valid certificate of compliance for that installation in the form of Annexure 1, which shall be accompanied by a test report in the format approved by the chief inspector, in respect of every such electrical installation.
- iii. An additional certificate must be completed for medical as well as for hazardous locations as per SANS 10142-1 clause 8.8.2 and clause 8.8.3. (A new test report for hazardous locations will be publish in amendment 9 of SANS 10142-1 that will replace additional certificate 8.8.3. The additional certificate is incorporated in the new test report).
- iv. Initial inspection must be complete for all new installations as per SANS 60079-14 Annexure C.

**5.4 EMR 9(8) – SANS 60079-17**

The employer or user shall cause all electrical machinery in a hazardous location to be **visually inspected** and tested at intervals **not exceeding two years**, or any other interval approved by the chief inspector after a risk assessment has been **conducted by a person who is competent to express an opinion** on the safety thereof: Provided that installed intrinsically safe equipment may in lieu of a test be verified in terms of the approved design.



- a. All EPE must be **Visually inspected** every two years
  - i. Record keeping is a key criterion
  - ii. Inspections must be auditable
  - iii. A period shorter than 2 years (1 year) is recommended where machinery is exposed to adverse climate or physical conditions
  - iv. Frequency can be determined/shortened by **Sample inspections**
  - v. Only a competent person can execute Ex inspections (Trained and assessed)
- b. Inspection of IS loops:
  - i. Certified approved IS loop calculations drawings must be used to inspect all IS loops.
  - ii. *Equipment must be verified per loop*
  - iii. *Loop must be linked to certified IS loop calculation certificate*
  - iv. *barrier or isolator as per Is loop certificate*
  - v. *device in hazardous area as per IS loop certificate*
  - vi. *Cable type /length as per IS loop calculation certificate*

**Note:** IS loop needs to be recertified if equipment replaced is not “in-kind” for example replacing a Honeywell transmitter with a Rosemount transmitter.

## 5.5 Approved Test Laboratories (ATL) In SA

- a. South African Bureau of Standards (SABS)



Tel: (012) 428 6400

- b. EXPLOLABS



Tel: (011) 316 4601

- c. Mining & Surface Certification



Tel: (012) 653 2959

## 6. Equipment Protection Level (EPL) SANS 60079-0

- a. The level of protection assigned to equipment based on:
  - i. its risk of becoming a source of ignition, and
  - ii. distinguishing the differences between
    - 1. explosive gas atmospheres,

2. explosive dust atmospheres

iii. The higher the risk like zone 0, 20 - a higher level of protection is required like Ex ia; ma.

iv. The lower the risk like Zone 2, 22 - a lower level of protection is required like Ex ic, p

v. **EPL's:**

Group	Ex risk	Risk	Zone	EPL	Minimum <u>type of protection</u>
I (mines)	energized	Very high		Ma	Same as Ga
I (mines)	de-energized in presence of Ex atmosphere	High		Mb	Same as Gb
II (gas)	explosive atmosphere > 1000 hrs/yr	Very high	0	Ga	ia, ma
II (gas)	explosive atmosphere between 10 and 1000 hrs/yr	High	1	Gb	ib, mb, px, py, e, o, q, d
II (gas)	explosive atmosphere between 1 and 10 hrs/yr	Low	2	Gc	nA, ic, pz
III (dust)	explosive surface > 1000 hrs/yr	Very high	20	Da	ta; ia; ma
III (dust)	explosive surface between 10 and 1000 hrs/yr	High	21	Db	tb, ib, mb, p
III (dust)	explosive surface between 10 and 10 hrs/yr	Low	22	Dc	tc, ic, p

## 7. ARP 0108

### Annex A

a. Upgrading and maintenance of EPE certificates for mines and factories

A.1 In South Africa, all EPE (Ex equipment) used in underground mines (**Group I**) and on surface (**Group II**) shall be covered by an *IA certificate*. *The requirements in A.2 to A.19 cover the validity of IA certificates.*

**Note:** South Africa do not except any overseas certification like ATEX, PTB etc.

## 8. Legal responsibilities

Description	Regulation	Standard	Responsibility
Area Classification	EMR 9(1) EIR 5(1)	SANS 10108 SANS 60079-10-1 Gas SANS 60079-10-2 Dust	Plant owner (Competent personnel; committees or consultant) Production Manager
Selection of Ex equipment	EMR 9(2) EIR 5(1)	SANS 10108 ARP 0108 SANS 60079-0	Plant owner and projects ( Engineering) Electrical Engineering Manager
Installation of Ex equipment	EMR 9(1) EMR 9(2) EIR 5(1)	SANS10086-1 SANS 60079-14 SANS10142-1	Plant owner done by own personnel or contractors
Certification of Ex equipment	EMR 9(3)	SANS 10108 ARP 0108 SANS 60079-0 Standard for specific type of protection Ex d; Ex e; Ex nA; etc	Approved test Laboratory(ATL)
Maintenance and inspection of Ex equipment	EMR 9(8) EIR 3(1)	SANS 10086-1 SANS 60079-17 SANS 10142-1	Plant owner( All Ex equipment must be inspected every two years) OSH ACT
Repair of Ex equipment	-	SANS 60079-19  SANS 10142-1	Manufacturer -OEM
Certificate of compliance(COC)	EIR 7	SANS 10142-1	MIE verify, inspect and test the installation for the purpose to issue a COC.

## 9. Conclusion - Risk assessments are always important

- Can risk assessment avoid accidents?
- What methods should be used?

**Don't be to sure:**

- You've carefully thought out all the angles.
- You've done it a thousand times.
- It comes naturally to you.
- You know what you're doing, its what you've been trained to do your whole life.
- Nothing could possibly go wrong, right ?

**Think Again !!**

