



NATIONAL RULES FOR ELECTRICAL INSTALLATIONS IN POTENTIALLY EXPLOSIVE ATMOSPHERES

ET 105:2001 (Second Edition)

Consolidated Amendments, Corrigenda and Errata 01/2010

Introduction

When ET 105:2001 was originally published the concepts of the EC Directives were new and unfamiliar to many practitioners. Following a number of seminars, held by ETCI on the subject, the concepts have now become familiar.

The major developments, over the past years, are that a number of new standards have been developed, and are listed in this revision. Following the agreement between CENELEC and IEC, all standards are developed in IEC and adapted for use in Europe with a new numbering system. The text of documents of the series IEC 60079 are prepared by IEC TC 31 ó Equipment for Explosive Atmospheres - and are submitted to the IEC / CENELEC parallel vote. When CENELEC members approve these new standard they are published as European Standards (EN)

Where the European Standards have been prepared, under a mandate given to CENELEC by the European Commission (EC), they are modified to conform to the relevant essential requirements detailed in Annex 11 of the Directive 94/9/EC. The lists of these harmonised standards are published in the Official Journal of the EC. At the date of publication these harmonised standards are considered to be the present state of the art.

The markings detailed in the EN standards should be supplemented by the marking according to the Directive.

The updates detail the recent standards, numbering system and suitable marking for the electrical equipment.

Page v	Member Organisations. Insert: Chartered Institution of Building Services Engineers. Consumersø Association of Ireland. Information & Communications Technology Ireland. National Consumer Agency. National Irish Safety Organisation. Delete: Corporation of Dublin. Insert: Dublin City Council. Delete: Institution of Engineers of Ireland. Insert: Engineers Ireland Delete: Institution of Electrical Engineers (Irish Branch) and Institution of Incorporated Engineers, and Insert: Institution of Engineering & Technology.
Page vii	Fifth paragraph: Line 1. Delete ET101:2000; Insert ET101:2008. Line 2. Delete Clause 482.1 of ET101:2000 and Insert Clause 422 of ET101:2008
Page 1	Clause 1.1: 2 nd paragraph delete ET101:2000; Insert ET101:2008 and Amendments

Section 2 List of harmonized standards published in the Official Journal of the European Commission

EN50050:2006	Electrical apparatus for potentially explosive atmospheres — Electrostatic handheld spraying equipment
EN 50104:2002	Electrical apparatus for the detection and measurement of oxygen — Performance requirements and test methods
EN50241-1:1999	Specification for open path apparatus for the detection of combustible or toxic gases and vapours . Part 1: General requirements and test methods
EN50241-2:1999	Specification for open path apparatus for the detection of combustible or toxic gases and vapours . Part 2: Performance requirements for apparatus for the detection of combustible gases
EN50281-1-2:1998	Electrical apparatus for use in the presence of combustible dust — Part 1-2: Electrical apparatus protected by enclosures — Selection, installation and maintenance
EN50281-2-1:1998	Electrical apparatus for use in the presence of combustible dust — Part 2-1: Test methods — Methods for determining the minimum ignition temperatures of dust
EN50303:2000	Group I, Category M1 equipment intended to remain functional in atmospheres endangered by firedamp and/or coal dust
EN50381:2004	Transportable ventilated rooms with or without an internal source of release
EN 60079-0:2006	Electrical apparatus for explosive gas atmospheres — Part 0: General requirements (IEC 60079-0:2004 (Modified))
EN60079-1:2007	Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures ‘d’ (IEC 60079-1:2007)
EN60079-2:2007	Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure ‘p’ (IEC 60079-2:2007)
EN60079-5:2007	Explosive atmospheres — Part 5: Equipment protection by powder filling ‘q’ (IEC 60079-5:2007)
EN60079-6:2007	Explosive atmospheres — Part 6: Equipment protection by oil immersion ‘o’ (IEC 60079-6:2007)
EN60079-7:2007	Explosive atmospheres — Part 7: Equipment protection by increased safety ‘e’ (IEC 60079-7:2006)
EN60079-11:2007	Explosive atmospheres — Part 11: Equipment protection by intrinsic safety ‘i’ (IEC 60079-11:2006)
EN 60079-15:2005	Electrical apparatus for explosive gas atmospheres — Part 15: Construction, test and marking of type of protection ‘n’ electrical apparatus (IEC 60079-15:2005)
EN60079-18:2004	Electrical apparatus for explosive gas atmospheres — Part 18: Construction, test and marking of type of protection encapsulation ‘m’ electrical apparatus (IEC 60079-18:2004)
EN60079-25:2004	Electrical apparatus for explosive gas atmospheres — Part 25: Intrinsically safe systems (IEC 60079-25:2003)
EN60079-26:2007	Explosive atmospheres — Part 26: Equipment with equipment protection level (EPL) Ga (IEC 60079-26:2006)
EN60079-27:2006	Electrical apparatus for explosive gas atmospheres — Part 27: Fieldbus intrinsically safe concept (FISCO) and Fieldbus non-incendive concept (FNICO) (IEC 60079-27:2005)
EN60079-28:2007	Explosive atmospheres — Part 28: Protection of equipment and transmission systems using optical radiation (IEC 60079-28:2006)
EN60079-29-1:2007	Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1:2007 (Modified))
EN60079-30-1:2007	Explosive atmospheres — Part 30-1: Electrical resistance trace heating — General and testing requirements (IEC 60079-30-1:2007)
EN61241-4:2006	Electrical apparatus for use in the presence of combustible dust — Part 4: Type of protection ‘pD’ (IEC 61241-4:2001)
EN61241-11:2006	Electrical apparatus for use in the presence of combustible dust — Part 11: Protection by intrinsic safety ‘iD’ (IEC 61241-11:2005)
EN61241-18:2004	Electrical apparatus for use in the presence of combustible dust — Part 18: Protection by encapsulation ‘mD’ (IEC 61241-18:2004)
EN62013-1:2006	Caplights for use in mines susceptible to firedamp — Part 1: General requirements - Construction and testing in relation to the risk of explosion (IEC 62013-1:2005)

The above European Norms (ENs) have been issued as Irish Standards with the prefix I.S.EN. For the up-to-date status of these standards you should refer to www.standards.ie

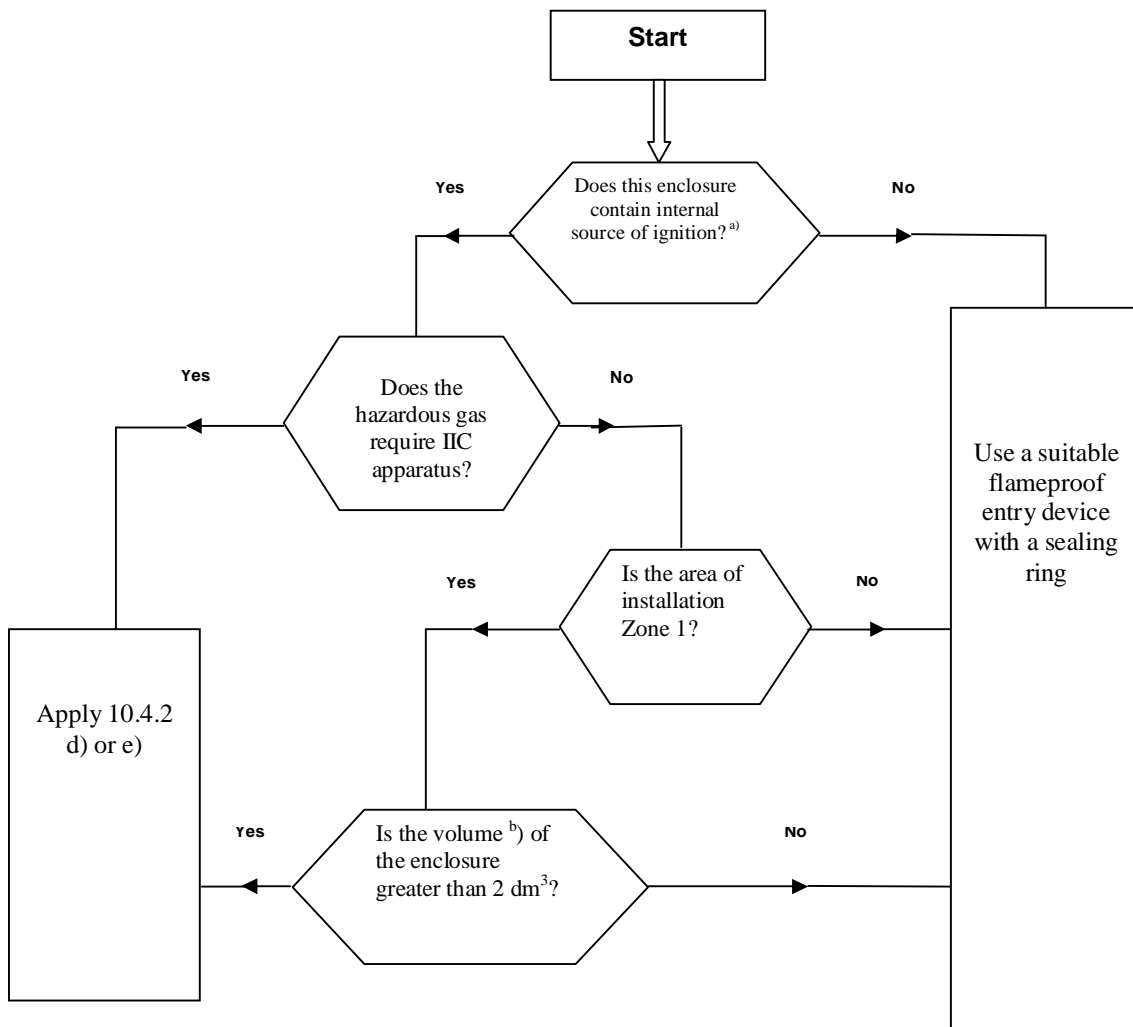
- Page 5 Intrinsically safe electrical systems (symbol is) ó certified: Delete I.S./EN50039. Insert I.S.EN60079 ó 25
- Page 5 Max experimental safe gap: Delete IEC.79.1A. Insert I.S.EN60079
- Page 7 Standardised type of equipment: Note. Delete I.S./EN 50018. Insert I.S.EN 60079-1
- Page 7 Type is equipment: Delete I.S./EN 50021. Insert I.S.EN 60079 615
- Page 7 Zone classification:
 Zone 2: At end of definition insert:
 Note: The words places and areas are synonymous.
- Zone 22: At end of definition insert:
 Note 1: Layers, deposits and heaps of combustible dust must be considered as any other source, which can form an explosive atmosphere.
 Note 2: Normal operation means the situation when installations are used within their design parameters.
- Page 8 Clause 4.1: Delete ET101:2000 Third Edition. Insert ET101:2008 Fourth Edition.
- Page 11 Clause 5.3.1:
 Delete I.S./EN50284. Insert I.S.EN60079-11
 Delete I.S./EN50020. Insert I.S.EN60079 -11
 Delete I.S./EN50039. Insert I.S.EN60079 25
- Page 11 Clause 5.3.2:
 Delete I.S./EN50015. Insert I.S.EN60079 -6
- Page 11 Clause 5.3.3:
 Delete I.S./EN50021. Insert I.S.EN60079 15
- Page 12 Clause 5.6:
 Delete I.S./EN50014 Clause 27. Insert I.S.EN 60079-0, Clause 29.
- Page 13 Clause 6.2: Delete ET101:2000. Insert ET101:2008
- Page 13 Clause 6.2.4: Delete 411.1 of ET101:2000. Insert 414 of ET101:2008.
- Page 14 Clause 6.4.1.1(a): Delete ET101:2000. Insert ET101:2008
 Delete Tables 54B to 54G. Insert Annex 54B.
- Page 14 Clause 6.4.1.1(b): Delete Annex 54A of ET101:2000. Insert Annex 54B of ET101:2008.
- Page 16 Clause 7.1: Insert at the beginning. Note: Protection against overcurrents must comply with ET101:2008, Chapter 43.
- Page 16 Clause 7.2: Insert at the beginning: Note: Means for emergency switch-off must comply with ET101:2008, Clause 537.2.
- Page 17 Clause 8.1.2: Delete ET101:2000. Insert ET101:2008
- Page 17 Clause 8.1.3: Title: Delete Non-sheathed single core cables. Insert Non-sheathed single core conductors.
- Page 19 Clause 8.1.13: Add Note: See ET101:2008 Clause 522.6.10

- Page 19 Clause 8.2: Delete I.S./EN50284. Insert I.S.EN60079-11
- Page 19 Clause 8.2 Note: Delete I.S./EN50284. Insert I.S.EN60079-11
Delete I.S./EN 50014 to I.S./EN 50020 and I.S./EN 50028.
Insert I.S.EN 60079 -0 to I.S.EN 60079-11 and I.S.EN60079-18
- Page 22 Clause 9.2.1: Delete I.S./EN50020. Insert I.S.EN60079 -11
- Page 22 Clause 9.2.2: Delete I.S./EN 50039. Insert I.S.EN60079 -25
- Page 23 Clause 9.5: Delete I.S./EN50020. Insert I.S.EN60079 -11
- Page 23 Clause 9.6.1: Delete I.S./EN50020. Insert I.S.EN60079 -11
Delete EN 50014. Insert I.S.EN60079 - 0
- Page 27 Clause 9.6.2.7: Delete I.S./EN 50020. Insert I.S.EN 60079 - 11
- Page 30 Clause 9.6.5.2: Delete I.S./EN 50020. Insert I.S.EN 60079 - 11
- Page 31 Clause 9.7: Delete I.S./EN50020. Insert I.S.EN60079 - 11
- Page 33 Table 10.1: Delete $\text{IIB} + \text{H}_2$

Insert: Note: Equipment marked $\text{IIB} + \text{H}_2$ and used in hydrogen atmosphere shall be installed as IIC equipment.

- Page 35 Replace Fig 10.1

FIGURE 10.1 SELECTION CHART



- Page 35 Clause 10.5: Delete I.S./EN 50014. Insert I.S.EN60079-0
 Add: Note 4: Manufacturers documentation and ATEX certification should be consulted for additional information.
- Page 38 Clause 11.2.4: Delete I.S./EN50014. Insert I.S.EN60079 -0
- Page 39 Clause 11.5: Delete I.S./EN50019. Insert I.S.EN60079 -7
- Page 40 Clause 12 a): Delete I.S/EN 50016. Insert I.S.EN 60079 - 2
 3rd Para delete IS/EN 50014. Insert I.S.EN 60079 -0
- Page 40 Clause 12, 3rd Paragraph: Delete I.S/EN 50014. Insert I.S.EN 60079 - 2
- Page 43 Clause 13: Delete I.S./EN50021. Insert I.S.EN60079 -15
- Page 44 Clause 13.4: Delete I.S./EN50021. Insert I.S.EN60079 -15
- Page 52 Clause 16.8: Delete Maintenance Routine for Electrical Installation in Potentially Explosive Atmospheres ET209ö. Insert ET209:2003
- Page 53 Clause 17.1: Insert: Note: For detailed inspection routine see Maintenance & Inspection Routine for Electrical Installation in Potentially Explosive Atmosphere, ET209:2003
- Page 53 Clause 17.1. Delete ET101:2000. Insert ET101:2008.
- Page 53 Clause 17.3.1: Delete ET101:2000. Insert ET101:2008.
- Page 53 Clause 17.3.2: Delete Table 17.1 Insert new Table 17.1 below

TABLE 17.1: MINIMUM VALUES OF INSULATION RESISTANCE		
Nominal circuit voltage a.c.	Test voltage V d.c.	Insulation resistance Megaohms
SELV and PELV	250	× 0.5
> ELV Ö500V incl. FELV	500	× 1.0
> 500	1000	× 1.0

- Page 54 Clause 17.3.4: Delete Bonding. Insert Equipotential bonding

Annex C (Informative)

Legislation

C.1 Statutory Legislation National & International

C.1.1 Position in Ireland

In Ireland law and standards associated with safety fall into three distinct categories:-

- Acts of the Oireachtas;
- Regulations Incorporated in Statutory Instruments (often implementing a European Directive) made under various Acts of the Oireachtas;
- Standards, Regulations and Guidelines issued by, organisations or committees with recognised expertise in a given field. These might be in the form of European Standards, Irish Standards or Code of Practice or Guidance.

C.1.2 National Legislation

The Health and Safety Authority is responsible for National Legislation under the Safety Health and Welfare at Work Act 2005 in addition to the 2005 Act there are other pieces of primary legislation which have a direct bearing on safety. These include the Chemicals Act 2008, the Dangerous Substances Act 1972 the Dangerous Substances (Amendment) Act 1979 and the European Communities Act 1972 and the various regulations implemented under these Acts.

C.1.2.1 The Safety Health and Welfare at Work Act 2005

The Act that has the greatest influence on safety at work in Ireland is the Safety Health and Welfare at Work Act 2005. This act is the successor to several other pieces of legislation going back to the 1955 Factories Act. The two sets of Regulations most directly associated with explosive atmospheres are **Safety Health and Welfare at Work (General Application) Regulations 2007 Part 8 Explosive Atmospheres at Place of Work and the European Communities (Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres) Regulations 1999 (S.I. No. 83 of 1999)**.

C.1.2.2 Safety Health and Welfare at Work (General Application) Regulations 2007 Part 8 Explosive Atmospheres at Places of Work

From 1 November 2007, part 8 of the General Application Regulations 2007 retransposed the (ATEX) Directive 1999/92/EC1 of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres and the risks from fire and explosion arising from flammable substances stored or used in the workplace. Part 8 of the General Application Regulations 2007 also replaced the Safety, Health and Welfare at Work (Explosive Atmospheres) Regulations 2003 (S.I. No. 258 of 2003), which are revoked from that date.

C.1.2.3 European Communities (Equipment and Protective Systems intended for use in Potentially Explosive Atmospheres) Regulations, 1999, S.I. No. 83 of 1999

These regulations implement European Council Directive 94/9/EC concerning equipment and protective systems intended for use in potentially explosive atmospheres. They apply to equipment protective systems, devices and components intended for use in potentially explosive atmospheres and going on the market for the first time after the 1st March 1996. The Regulations require compliance with the essential health and safety requirements (Schedule 2) and the affixing of the CE marking. The CE marking can only be affixed if the equipment has undergone the appropriate conformity assessment procedure (Regulation 7) and in respect of which an EC declaration of Conformity has been drawn up.

C.1.2.3.1 Safety, Health and Welfare at Work (General Application) Regulations 2007 Part 3: Electricity

The objection of these Regulations is to set out minimum standards aimed at the prevention of occupational accidents associated with the use of electricity in the workplace. Part 3 of the General Application Regulations 2007 requires precautions to be taken against the risk of death or personal injury and to prevent danger so far as it reasonably practicable from electricity used in work activities. From 1 November 2007, Part 3 of the Safety Health and Welfare at Work (General Application) Regulations 1993 (S.I. No. 44 of 1993) relating to electricity which is revoked from that date. Part 3 of the General Application Regulations 2007 imposes duties, principally on employers, the self-employed and employees, in respect of electrical equipment and installations in a place of work and in respect of work activities on or near electrical equipment. It also imposes duties on persons who design, install, maintain, use or are in control of electrical networks. The purpose of this Guide is to describe the nature of the precautions in general terms. The Regulations are a framework in nature and state principles of electrical safety in a form which may be applied to any electrical equipment and any work activity that come within the scope of the Regulations.

C.1.2.3.2 Dangerous Substances Act 1972 and 1979

This act consolidates, with amendments, enactments relating to explosives, petroleum and other dangerous substances. The following regulations are made under this act:-

C.1.2.3.3 Dangerous Substances (Retail and private petroleum stores) Regulations S.I. number 311 of 1979

Amended by SI No. 303 of 1988, IS No. 424 of 1999, SI No. 630 of 2006. These regulations control more effectively the licensing of òretails storesö òpetrol filling stationsö and òprivate storesö for the keeping of petroleum Class I (petroleum-spirit) and for the purpose of preventing risk of injury to persons or property in the storage, conveying, loading, unloading and in dispensing operations carried on in connection with the stores.

Regulations relating to the design, installation, working and maintenance of electrical apparatus are laid down as well as suitability of construction and protection to prevent danger by ignition, fire or explosion the prevention of the generation, accumulation or discharge of static electricity are included.

The arrangement for suitable inspection and testing at intervals not exceeding three years by a competent person of all electrical apparatus located in hazardous areas are also a requirement.

C.1.2.3.4 Dangerous Substances (Conveyance of petroleum by road) (trade of business) Regulations S.I. number 314 of 1979

The intention of these Regulations is to prevent risk of injury to person or property in the conveying in vehicles including road-tankers and trailers, of petroleum Class I (petroleum-spirit) or petroleum Class II and in the loading and unloading of such vehicles at petroleum stores.

Requirements relating to:-

- the design, construction, maintenance, inspection and certification of road tank, vehicles, trailers, tanks, containers, associated equipment including electrical apparatus.
- preventing of risk of ignition, explosion of fire of petroleum vapours due to electricity, static electricity or other source of ignition.

are included in the regulations.

C.1.2.3.5 Dangerous Substances (petroleum bulk stores) regulations S.I. number 313 of 1979

Part of regulation 45(1), Regulation 79 and Schedule 6 have been revised ó See S.I. No 357 of 1995.

The reason for these regulations is to prevent risk of injury to person or property in the keeping, conveying, loading and unloading of petroleum at three categories of bulk stores namely, distribution stores, major distribution stores and private bulk stores.

Regulations relating to:

- the design, installation working and maintenance of electrical apparatus are laid down as well as suitability of construction and protection to prevent danger by ignition, fire or explosion.
- the inspection and where necessary the testing by a competent person after the repair of electrical apparatus.
- the arrangement for suitable inspection and testing at intervals not exceeding twelve months by a competent person of all electrical apparatus located in hazardous areas is required.

C.1.2.3.6 Dangerous Substances (oil jetties) regulations S.I. number 312 of 1979

The purpose of these regulations is to provide for all practicable steps to be taken by the appropriate persons concerned to prevent risk of injury to persons or property:-

- in the vicinity of petroleum ships or oil jetties
- in the loading or unloading of petroleum ships at oil jetties or in harbours and
- in the conveying by pipeline of petroleum to or from the ships tanks and storage tanks ashore.

Requirements are laid down relating to the operational safety procedures and practices to be observed. Of particular interest to electrical engineers are requirements relating to:-

- appropriate alarm and signal systems necessary for communication in the event of an emergency
- safeguards against risk of injury and ignition of vapours of petroleum from electricity, static electricity, radio or radar equipment
- the carrying out of arrangements for the inspection and testing by a competent person at intervals not exceeding fifteen months of all electrical apparatus located at an oil jetty.

1.1.3 The European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations, 2006. S.I. No 74 of 2006

These Regulations implement Council Directive 2003/105/EC (amending 96/82/EC) on the control of major accident hazards involving dangerous substances (also referred to as the 'Seveso 2' or COMAH Directive). They replace the EC (Control of Major Accident Hazards involving Dangerous Substances) Regulations, 2000 (SI 476 of 2000).

The purpose of the Regulations is to ensure that, at locations where dangerous substances are handled in quantities above the specified thresholds; there will be a high level of protection for people, property and the environment. This is to be achieved by:

- (i) preventing or minimising the risk of a major accident, and
- (ii) taking all the necessary measures to limit the consequences of such an accident, should it occur.

C.1.3 EC Directives

In recent years, two Directives, which have particular influence in the field of potentially explosive atmospheres, have been developed by the European Community. The first is the Directive 94/9/EC of the European Parliament and the Council of 23rd March 1994 on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres. (Commonly known as the ATEX 100A Directive.)

C.1.3.1 ATEX DIRECTIVE 100A

The Directive 94/9/EC is a directive laying down essential health and safety requirements (ESHRs) and leaving to standards, primarily European harmonized standards, to give technical expression to the safety requirements contained in the directive.

The objective of directive 94/9/EC is to ensure free movement for the products to which it applies in the EU territory. The directive, based on Article 100a of the EU Treaty, provides for harmonized protection requirements and procedures to establish compliance.

Directive 94/9/EC is a total harmonization directive, i.e. its provisions replace divergent National and European legislation, which cover the same subjects as stipulated by directive.

The directive covers both mining and non-mining equipment and is different to the previous directives in that it includes non electrical as well as electrical equipment. It is also expanded to include the potentially explosive atmosphere for dust in air and well as the potentially explosive gas, vapour and mists in air.

C.1.3.2 ATEX DIRECTIVE 118A

The second EC Directive was published with the objective of improving the health and safety of people at work in hazardous areas. This Directive is known as the ATEX 118A Directive and its title is Directive 1999/92/EC of the European Parliament and of the Council of 16 December 1999 - on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres. (Commonly known as the ATEX 118A Directive.)

The aims of this Directive are:

- a) To establish harmonised minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres.
- b) To establish specific provisions for improving the safety and health protection of workers at risk from potentially explosive atmospheres.

This Directive requires that hazardous areas are classified into zones based on the likelihood and the duration of an occurrence of an explosive atmosphere including the assessment of the anticipated effects. The Directive contains definitions of zones and guide criteria for the performance of work

