

SUBSIDIARY LEGISLATION 424.27

**WORK PLACE (MINIMUM REQUIREMENTS FOR
WORK) (CONFINED SPACES AND SPACES
HAVING EXPLOSIVE ATMOSPHERES)
REGULATIONS**

30th January, 2004

LEGAL NOTICE 41 of 2004.

1. (1) The title of these regulations is the Work Place (Minimum Requirements for Work) (Confined Spaces and Spaces having Explosive Atmospheres) Regulations. Title and scope.

(2) The scope of these regulations is to establish minimum requirements for the occupational health and safety protection of workers working in confined spaces and, or in spaces having explosive atmospheres.

2. In these regulations, unless the context otherwise requires: Interpretation.

"the Act" means the Occupational Health and Safety Authority Act; Cap. 424.

"Authority" means the Occupational Health and Safety Authority established by article 8 of the principal Act;

"competent person" means a person having suitable training and sufficient knowledge, expertise and skill for the safe performance of the specific task or work required;

"confined space" means an enclosed space which has limited openings for entry or egress, and, or which may contain insufficient levels of oxygen or contain or produce dangerous air contaminants liable to cause a risk to the health and safety of workers who enter such a space, and includes any room, chamber, booth, tunnel, tank, silo, vat, pit, pipe, drain, sewer or flue and any other enclosed space:

Provided that for the purposes of these regulations, any enclosed space which is liable to be flooded or filled by the inflow of any liquid or solid material shall also be considered a confined space;

"explosive atmosphere" means a mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture;

"fumes" includes any gas or vapour;

"maintenance" means keeping in an efficient state, in efficient working order, in good repair and without loss or deterioration of function, and includes inspection, testing, cleaning, lubricating, adjusting and replacing as necessary;

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"supervisor" means a person appointed or employed by an employer having overall direction on site and, or having the task of supervising entry and work in a confined space, and who has received appropriate training for such a task;

"suitable system of maintenance" includes the regular maintenance, the proper carrying out of repairs in the shortest possible period, the prohibition of access to and use of defective equipment, and the keeping of appropriate and adequate records to ensure the proper implementation and easy monitoring of such a system, and where applicable, taking due regard of the manufacturer's or installer's specifications.

Non-applicability
of these
regulations.

3. These regulations shall not apply to:

- (a) areas used directly for and during the medical treatment of patients;
- (b) appliances burning gaseous fuels (any fuel which is in a gaseous state at a temperature of 15°C under a pressure of 1 bar) used for cooking, heating, hot water production, refrigeration, lighting or washing and having, where applicable, a normal water temperature not exceeding 105°C;
- (c) forced draught burners and heating bodies to be equipped with such burners;
- (d) safety devices, controlling devices or regulating devices and sub-assemblies, other than forced draught burners and heating bodies to be equipped with such burners separately marketed for trade use and designed to be incorporated into an appliance burning gaseous fuel or assembled to constitute such an appliance;
- (e) the manufacture, handling, use, storage and transport of explosives or chemically unstable substances;
- (f) the use of means of transport by land, water and air, to which the pertinent provisions of any international agreement (e.g. ADNR, ADR, ICAO, IMO, RID), and the legislative enactments giving effect to those agreements, apply. Means of transport intended for use in a potentially explosive atmosphere shall not be excluded.

PART I

Minimum Health and Safety Requirements
for Work in Confined Spaces

General principles.

4. (1) An employer shall ensure that all confined spaces at the workplace are identified.

(2) An employer shall take all reasonable measures to ensure that work in a confined space is avoided if it is so practicable, and for this purpose shall consider alterations to the confined space, including structural alterations, and, or modifications to existing work practices so as to enable work to be carried out from outside the space.

(3) Where it is deemed necessary for work to be carried out in a confined space, it shall be the duty of an employer to ensure that the ingress to and the egress from the confined space, and the work to be carried out, are undertaken under a system of work which offers the highest degree of safety and which minimises risks to health as far as reasonably practicable.

(4) It shall be the duty of an employer to ensure that all work equipment, including equipment used for work activities in confined spaces, or which is used to enter or exit confined spaces, is adequate and suitable for use in a confined space, and subjected to a suitable system of maintenance:

Provided that no work equipment shall be used in a confined space, if it is incompatible with any hazard present or likely to be present, or which can give rise to a risk to occupational health and safety by virtue of its presence or its use in the confined space.

(5) It shall be the duty of an employer to ensure that every item, object, article or thing required to be in a confined space, which by virtue of its not being properly maintained can give rise to risks to the health and safety of workers entering the space, as well as the confined space itself, shall be subject to a suitable system of maintenance.

5. (1) No person shall enter or be allowed to enter a confined space to carry out work for any purpose unless it is not reasonably practicable to achieve that purpose without such entry.

Work in a confined space to be authorised by competent person.

(2) It shall be the duty of an employer to ensure that no person enters, and that no work is carried out in a confined space unless a valid, written permit to work has been issued by a competent person authorising entry and work under appropriate conditions, except in exceptional circumstances, for rescue or evacuation purposes, and provided that such entry and work is carried out by persons wearing suitable breathing apparatus and that all other possible measures required to protect health and safety are taken.

6. An employer shall, prior to allowing entry or work in a confined space, ensure that:

Duties and responsibilities of the employer.

- (a) a proper permit to work system is set up and maintained to regulate any entry and work in each and every confined space, depending on the nature of the risks;
- (b) a competent person has carried out an assessment of the hazards which are present in the confined space, which may arise during the course of work inside the confined space and which are present outside but which may create an additional hazard for workers inside the confined space, and for all such hazards, the competent person shall assess the resultant risks to health and safety;
- (c) the valid permit to work is placed at a position outside

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and adjacent to the confined space, where it can be readily viewed and read, and adequate measures shall be taken to prevent, so far as reasonably practicable, the defacement and alteration of this document:

Provided that where the hazards and resultant risks are deemed by the competent person to be low, the permit to work document need not be put up, and shall inform the workers accordingly;

- (d) any worker who is to perform work in a confined space is informed of the contents of the permit to work;
- (e) all the requirements set out by the competent person in the permit to work are complied with at all times when any person enters the confined space;
- (f) entry into a confined space by any person is essential.

Duties and responsibilities of competent persons.

7. (1) It shall be the responsibility of the competent person to carry out a proper assessment of the risks to health using accurate, reliable and suitably calibrated monitoring equipment prior to deciding whether to issue a permit to work allowing entry or work into confined spaces:

Provided that the employer shall subject the monitoring equipment to a suitable system of maintenance.

(2) Before issuing a permit to work, it shall be the duty of the competent person to give due consideration to any risks to health and safety arising from hazards which are present, or which may arise from, or during the course of the work inside the confined space, and to make recommendations for the elimination of hazards and the control of risks, including with regards to:

- (a) the general conditions and the dimensions of the space;
- (b) the ease of access and egress into the space, taking into consideration any equipment or protective clothing that the worker is expected to be using;
- (c) the risk of fire or explosion;
- (d) the risks to health from harmful levels of any gas or fume, or from the lack of oxygen, or from the presence of any other chemical that may pose a risk to health and safety;
- (e) the temperatures present in the confined space, or which are likely to be generated during the course of work in the confined space;
- (f) the level of lighting;
- (g) the nature of the task or tasks to be carried out in the confined space, including the work load;
- (h) the level of noise likely to be generated in the confined space;
- (i) the risks to health arising out of the use of any

chemical or from the ingress of gases, liquids, or free-flowing solids;

- (j) the use of electrical equipment, including the risk of electrocution, fire or explosion, and or the risk of oxygen depletion caused by burning, welding or grinding;
- (k) the introduction of exhaust fumes from the use of mobile plant or equipment outside the confined space.

(3) The competent person examining a confined space shall issue two copies of a permit to work and shall state in writing:

- (a) the level of the oxygen concentration and that of any explosive gas or vapour or of any other hazardous gases present in the confined space, as well as the presence of any other substance which may cause a risk to health or safety;
- (b) whether work can be allowed, and the type of work activity to be allowed;
- (c) the safety precautions required by any person entering the confined space, and any protective measures which are required to be taken by the employer or by the workers entering the confined space;
- (d) the number of persons allowed at any one time in the confined space;
- (e) the duration of the validity of the permit to work, and the time at which a further assessment is required:

Provided that where the competent person makes any recommendations regarding safety precautions or protective measures that are required to be taken before ingress into the confined space, there shall be entered into the permit to work a declaration by the supervisor at the site that such precautions or measures have been taken:

Provided further that until such safety precautions or protective measures indicated by the competent person are taken, no person shall be allowed to enter the confined space.

(4) No permit to work shall be valid unless it contains the name and signature of the competent person and the name and countersignature of the supervisor at the site.

(5) Places which are or can be connected via openings to confined spaces shall be taken into account in assessing risks.

8. (1) An employer shall appoint a sufficient number of supervisors to ensure adequate supervision on all matters relating to the entry and work in a confined space.

Duties of supervisors.

(2) It shall be the duty of the supervisor to manage and implement the permit to work system, and to ensure that the terms, conditions or recommendations laid out in the permit to work are followed.

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(3) At the end of a working shift, a supervisor should ensure that new workers, including replacements, are informed of the permit to work and its contents, including any terms, recommendations or conditions made by the competent person.

Duties of workers. **9.** (1) It shall be the duty of a worker to abide by the terms, conditions and recommendations, and to take all precautions which are stipulated in the permit to work system.

(2) If modifications are required to the task in hand, or if working conditions change, or if a worker is required to carry out activities not listed on the permit to work, the worker concerned shall inform the supervisor, who on his part shall inform the competent person, who shall amend the original permit to work or issue a new one.

Confined spaces. **10.** (1) A confined space shall, unless there is other adequate means of egress, be provided with a manhole, which may be rectangular, oval or circular in shape, and shall not be less than 45 centimetres long and 40 centimetres wide, or if circular, shall not be less than 58 centimetres in diameter:

Provided that where the nature of the hazards and risks necessitate that a person entering a confined space uses breathing apparatus, the dimensions of the manhole shall be adjusted accordingly.

(2) No person shall enter, or shall be expected to enter, a confined space which is less than 0.9 metres high and 0.6 metres wide.

Working in confined spaces. **11.** (1) No person shall be allowed to enter or remain in a confined space for any purpose unless such person -

- (a) is authorised to enter by a competent person, and
- (b) as far as reasonably practicable, is wearing a harness with a securely attached rope, and
- (c) while another person is keeping watch outside and insofar as such other person is capable of pulling the person in a confined space out, the person outside is holding the free end of the rope:

Provided that no person shall enter a confined space without wearing or using breathing apparatus if in the opinion of the competent person, breathing apparatus has to be worn to safeguard the health of the person or persons entering the space.

(2) Where the confined space has been certified by a competent person as being safe for entry without the need of breathing apparatus, the certification shall specify a period during which the use of breathing apparatus shall remain unnecessary:

Provided that no person shall be allowed to enter or remain in the space unless he has been warned when that period will expire.

12. (1) A confined space shall not be certified under regulation 11(2) unless: Breathing hazards.

- (a) effective steps have been taken to prevent any ingress of dangerous fumes or effective steps are taken to protect the workers entering the space from such dangerous fumes; and
- (b) any sludge or deposit liable to give off dangerous fumes or which can in any other way cause a risk to health or safety, has been removed, and the space contains no other material liable to give off dangerous fumes; and
- (c) the space has been adequately ventilated and tested for dangerous fumes and has a supply of air adequate for respiration; and
- (d) steps have been taken to protect workers from the ingress or sudden movement of substances and materials.

(2) In those confined spaces where there is the possibility that the concentration of contaminants or of oxygen may change suddenly or unexpectedly, it shall be the duty of an employer to ensure that workers who enter such confined spaces are provided with, and trained in the use of suitable equipment by which to carry out continuous air monitoring, and to provide the workers with adequate self-contained breathing apparatus which allows the workers to exit the confined space whenever a high risk situation ensues.

(3) No permit to work shall be issued by a competent person in respect of any confined space in which the proportion of oxygen in the air is liable to have been substantially reduced unless -

- (a) either recommendations are made regarding the use of suitable breathing apparatus;
- (b) or the space has been and remains adequately ventilated and a competent person has tested and certified as safe for entry without breathing apparatus.

(4) No compressed gas cylinders, except those used in conjunction with breathing apparatus shall be allowed inside a confined space.

(5) No oxygen enriched or pure oxygen breathing air, except for the purposes of resuscitation, shall be allowed into a confined space, provided that where this is permissible, the use shall be performed under the guidance of the competent person, who shall make such recommendations as are indicated to ensure health and safety.

13. (1) It shall be the duty of an employer to ensure that only workers who have undergone health surveillance and who have been certified as being medically fit to enter and work in a confined space are allowed to enter any confined space.

Health surveillance.

(2) When carrying out such an examination, it shall be the duty

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of a medical practitioner to take into account the physical constraints created by the dimensions and layout of the space, and to assess the individual's physique or physical attributes, and the individuals' fitness to enter and to carry out the work assigned and to make use of any protective clothing or equipment:

Provided that the examining doctor shall stipulate in the certificate the date when the next examination shall be due.

(3) No person shall be certified by a medical practitioner as being fit to enter and work in a confined space if the person is found to be suffering from any of the medical conditions listed in Part 1 of Annex I, or if the person falls within any of the categories listed in Part 2 of Annex I.

Training of
workers and
supervisors.

14. (1) An employer shall ensure that all workers in his employ who are to enter a confined space have an understanding of the work to be undertaken, the possible hazards and the resultant risks to health and safety, the necessary precautions which need to be taken, how to minimise any risks arising during the course of working inside the confined space, and on how to make proper use of any personal protective equipment required to safeguard health and safety, and for these purposes, an employer shall train and retrain his workers as necessary.

(2) Without prejudice to the generality of the foregoing, workers should be given information about:

- (a) the need to avoid entry into a confined space unless the purpose to be achieved could not be reasonably attained without such entry;
- (b) testing and, or monitoring of the atmosphere, including training to carry out such testing and, or monitoring;
- (c) isolation procedures;
- (d) correct selection and use of safety equipment;
- (e) selection, use and maintenance of personal protective equipment, including respiratory protective equipment;
- (f) the indications for, and the procedures to be followed whenever the need arises for shutdown of plant or equipment;
- (g) communication between workers inside and outside the confined space;
- (h) procedures to be followed when the need arises to raise the alarm;
- (i) recording systems in use, including maintenance logs, accidents and near misses.

(3) Supervisors should have an understanding of, be given information on, and where relevant, should be trained in:

- (a) the provisions of these regulations;

- (b) the principles of risk assessment;
- (c) the work activities and processes involved;
- (d) the necessary control measures and procedures;
- (e) permit to work systems;
- (f) the identification and control of hazards and risks;
- (g) recognizing and dealing with an emergency situation and following emergency procedures;
- (h) the keeping of records required by these regulations.

15. (1) Where it is deemed necessary for work to be carried out in a confined space, it shall be the duty of an employer to make suitable and sufficient arrangements for first aid, rescue, fire fighting and for the evacuation of workers.

Emergency response.

(2) For the purpose of implementing the foregoing, an employer shall:

- (a) appoint and ensure that are trained a sufficient number of first aiders, and
- (b) shall make such necessary arrangements with services outside of the workplace as are required.

(3) An employer shall ensure that the workers are informed and adequately trained in the procedures to be followed in the event of an emergency.

(4) It shall be the duty of an employer to inform any person whether in his employ or not, who has to enter a confined space, of the risks to health and safety identified by the competent person, and of the protective measures indicated.

16. (1) An employer shall ensure that records are kept of:

Keeping of records.

- (a) risk assessments carried out, identified hazards and control measures;
- (b) training;
- (c) maintenance on and inspection of safety equipment;
- (d) ventilation specifications and checks;
- (e) atmospheric testing and, or monitoring;
- (f) completed permits to work;
- (g) details of emergency, rescue and first aid arrangements;
- (h) medical examinations.

(2) The employer shall keep one copy of all the permits issued by a competent person at his workplace for a period of two years from the time of commencement of its validity.

Part II

Minimum Health and Safety Requirements for Work in Explosive
Atmospheres: Obligations of the Employer

Prevention of and
protection against
explosions.

18. (1) With a view to preventing and providing protection against explosions, the employer shall take technical and, or organisational measures appropriate to the nature of the operation, in order of priority and in accordance with the following basic principles:

- (a) the prevention of the formation of explosive atmospheres, and
- (b) where the nature of the activity does not allow such prevention:
 - (i) the avoidance of the ignition of explosive atmospheres, and
 - (ii) the mitigation of the detrimental effects of an explosion so as to ensure the health and safety of workers.

(2) Such measures as are referred to in subregulation (1) shall, where necessary, be combined and, or be supplemented with measures against the propagation of explosions and shall be reviewed regularly and, in any event, whenever significant changes occur.

Assessment of
explosion risks.
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19. (1) In carrying out the obligations laid down in regulation 6 of the General Provisions for Health and Safety at Work Places Regulations, the employer shall assess the specific risks arising from explosive atmospheres, taking account at least of:

- (a) the likelihood that explosive atmospheres will occur and their persistence,
- (b) the likelihood that ignition sources, including electrostatic discharges, will be present and become active and effective,
- (c) the installations, substances used, processes, and their possible interactions,
- (d) the scale of the anticipated effects.

(2) Explosion risks shall be assessed overall.

(3) Places which are or can be connected via openings to places in which explosive atmospheres may occur shall be taken into account in assessing explosion risks.

General
obligations.

20. In order to ensure the safety and health of workers, and in accordance with the basic principles of risk assessment and those laid down in regulation 18, the employer shall take the necessary measures so that:

- (a) where explosive atmospheres may arise in such quantities as to endanger the health and safety of workers or others, the working environment is such

that work can be performed safely, and

- (b) in working environments where explosive atmospheres may arise in such quantities as to endanger the safety and health of workers, appropriate supervision during the presence of workers is ensured in accordance with the risk assessment by the use of appropriate technical means.

21. (1) The employer shall classify places where explosive atmospheres may occur into zones in accordance with Annex II.

Places where explosive atmospheres may occur.

(2) The employer shall ensure that the minimum requirements laid down in Annex III are applied to places covered by subregulation (1) .

(3) Where necessary, places where explosive atmospheres may occur in such quantities as to endanger the health and safety of workers shall be marked with signs at their points of entry in accordance with Annex IV.

22. (1) In carrying out the obligations laid down in regulation 19, the employer shall ensure that a document, hereinafter referred to as the "explosion protection document", is drawn up and kept up to date.

Explosion protection document.

(2) The explosion protection document shall demonstrate in particular:

- (a) that the explosion risks have been determined and assessed,
- (b) that adequate measures will be taken to attain the aims of these regulations,
- (c) those places which have been classified into zones in accordance with Annex II,
- (d) those places where the minimum requirements set out in Annex III will apply,
- (e) that the workplace and work equipment, including warning devices, are designed, operated and maintained with due regard for health and safety,
- (f) that arrangements have been made for the safe use of work equipment.

(3) The explosion protection document shall be drawn up prior to the commencement of work and be revised when the workplace, work equipment or organisation of the work undergoes significant changes, extensions or conversions.

(4) The employer may combine existing explosion risk assessments, documents or other equivalent reports produced under other laws or regulations.

23. (1) Work equipment for use in places where explosive atmospheres may occur which is already in use or is made available in the undertaking or establishment for the first time before the date of publication of these regulations, shall comply from that date

Special requirements for work equipment and workplaces.

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with the minimum requirements laid down in Annex III, Part A, if no other law or regulation is applicable or is so only partially.

(2) Work equipment for use in places where explosive atmospheres may occur, which has been made available in the undertaking or establishment for the first time after the date of publication of these regulations, shall comply with the minimum requirements laid down in Annex III, Parts A and B.

(3) Workplaces which contain places where explosive atmospheres may occur and which have been used for the first time after the date of publication of these regulations shall comply with minimum requirements set out in these regulations.

(4) Where workplaces which contain places where explosive atmospheres may occur have been already in use before the date of publication of these regulations, they shall comply with the minimum requirements set out in these regulations no later than three years after that date.

(5) If, after the date of publication of these regulations, any modification, extension or restructuring is undertaken in workplaces containing places where explosive atmospheres may occur, the employer shall take the necessary steps to ensure that these comply with the minimum requirements set out in these regulations.

Part III

General provisions

Duty of
coordination.

24. (1) Where workers from several undertakings are present at the same workplace, each employer shall be responsible for all matters coming under his control.

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(2) Without prejudice to the individual responsibility of each employer as provided for in the General Provisions for Health and Safety at Work Places Regulations, the employer responsible for the workplace shall coordinate the implementation of all the measures concerning the workers' health and safety and shall state, in the explosion protection document referred to in regulation 22 and, or the permit to work referred to in regulation 5, as applicable, the aim of that coordination and the measures and procedures for implementing it.

No person shall
deface or alter a
permit to work, etc.

25. No person shall deface or in any way alter a valid permit to work or an explosion protection document.

Onus of proof.

26. In any proceedings for an offence under these regulations consisting of a failure to comply with a duty or requirement to do something so far as is practicable or so far as is reasonably practicable, or to use the best practicable means to do something, it shall be for the accused to prove, as the case may be, that it was not practicable or not reasonably practicable to do more than was in fact done to satisfy the duty or requirement, or that there was no better practicable means than was in fact used to satisfy such duty or requirement.

27. Any person who knowingly or recklessly interferes with the process of providing a safe and healthy place of work, shall be guilty of an offence. Offences.

ANNEX I

(Regulation 13 (3)).

Part 1: List of medical conditions for which a person may not be certified fit to enter and work in a confined space.

1. A history of fainting, black-outs or bouts of loss of consciousness, including a history of epilepsy or uncontrolled diabetes mellitus
2. A history of shortness of breath
3. Disabilities related to limited dexterity or mobility, whether temporary or permanent
4. A history of mental disease or of any other relevant mental condition
5. A history of heart disease or high blood pressure
6. Severe disabilities related to hearing or vision
7. A history of drug or alcohol abuse, or when a worker is taking medication liable to cause drowsiness, lack of co-ordination, slowing of reflexes or response times or disorientation
8. Any other serious medical condition which in the opinion of the medical practitioner carrying out the examination should preclude a worker from being certified fit to enter or to work in a confined space.

Part 2: List of categories of workers who may not be certified as being fit for entry or to work in a confined space.

1. Young workers
2. Pregnant workers, or workers who have recently given birth or are breastfeeding.

ANNEX II

CLASSIFICATION OF PLACES WHERE EXPLOSIVE ATMOSPHERES
MAY OCCUR

Preliminary note

The following system of classification must be applied to places where precautions in accordance with regulations 18, 19, 21 and 22 are taken.

1. Places where explosive atmospheres may occur

A place in which an explosive atmosphere may occur in such quantities as to require special precautions to protect the health and safety of the workers concerned is deemed to be hazardous within the meaning of these regulations.

A place in which an explosive atmosphere is not expected to occur in such quantities as to require special precautions is deemed to be non-hazardous within the meaning of these regulations.

Flammable and, or combustible substances are considered as materials which may form an explosive atmosphere unless an investigation of their properties has shown that in mixtures with air they are incapable of independently propagating an explosion.

2. Classification of hazardous places

Hazardous places are classified in terms of zones on the basis of the frequency and duration of the occurrence of an explosive atmosphere.

The extent of the measures to be taken in accordance with Annex III, Part A, is determined by this classification.

Zone 0

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is present continuously or for long periods or frequently.

Zone 1

A place in which an explosive atmosphere consisting of a mixture with air or flammable substances in the form of gas, vapour or mist is likely to occur in normal operation occasionally.

Zone 2

A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Zone 20

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.

Zone 21

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation occasionally.

Zone 22

A place in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

Notes:

1. Layers, deposits and heaps of combustible dust must be considered as any other source which can form an explosive atmosphere.
2. "Normal operation" means the situation when installations are used within their design parameters.

ANNEX III
(Regulation 23)

A. Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres

Preliminary note

The obligations laid down in this Annex apply to:

- places classified as hazardous in accordance with Annex II whenever

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required by the features of workplaces, workstations, the equipment or substances used or the danger caused by the activity related to the risks from explosive atmospheres,

- equipment in non-hazardous places which is required for, or helps to ensure, the safe operation of equipment located in hazardous places.

1. Organisational measures

1.1. Training of workers

The employer must provide those working in places where explosive atmospheres may occur with sufficient and appropriate training with regard to explosion protection.

1.2. Written instructions and permits to work

Where required by the explosion protection document:

1.2.1. work in hazardous places must be carried out in accordance with written instructions issued by the employer,

1.2.2. a system of permits to work must be applied for carrying out both hazardous activities and activities which may interact with other work to cause hazards.

1.3. Permits to work must be issued by a person with responsibility for this function prior to the commencement of work.

2. Explosion protection measures

2.1. Any escape and, or release, whether or not intentional, of flammable gases, vapours, mists or combustible dusts which may give rise to explosion hazards must be suitably diverted or removed to a safe place or, if that is not practicable, safely contained or rendered safe by some other suitable method.

2.2. If an explosive atmosphere contains several types of flammable and, or combustible gases, vapours, mists or dusts, protective measures shall be appropriate to the greatest potential risk.

2.3. Prevention of ignition hazards in accordance with regulation 18 must also take account of electrostatic discharges, where workers or the working environment act as charge carrier or charge producer. Workers must be provided with appropriate working clothes consisting of materials which do not give rise to electrostatic discharges that can ignite explosive atmospheres.

2.4. Plant, equipment, protective systems and any associated connecting devices must only be brought into service if the explosion protection document indicates that they can be safely used in an explosive atmosphere. This applies also to work equipment and associated connecting devices which are not regarded as equipment or protective systems as herein defined if their incorporation into an installation can in itself give rise to an ignition hazard. Necessary measures must be taken to prevent confusion between connecting devices.

2.4.1. "Equipment" means machines, apparatus, fixed or mobile devices, control components and instrumentation thereof and detection or prevention systems which, separately or jointly, are intended for the generation, transfer, storage, measurement, control and conversion of energy for the processing of material and which are capable of causing an explosion through their own potential sources of ignition.

2.4.2. "Protective systems" means design units which are intended to halt

incipient explosions immediately and, or to limit the effective range of explosion flames and explosion pressures.

2.5. All necessary measures must be taken to ensure that the workplace, work equipment and any associated connecting device made available to workers have been designed, constructed, assembled and installed, and are maintained and operated, in such a way as to minimise the risks of an explosion and, if an explosion does occur, to control or minimise its propagation within that workplace and, or work equipment. For such workplaces appropriate measures must be taken to minimise the risks to workers from the physical effects of an explosion.

2.6. Where necessary, workers must be given optical and, or acoustic warnings and the same workers withdrawn before the explosion conditions are reached.

2.7. Where required by the explosion protection document, escape facilities must be provided and maintained to ensure that, in the event of danger, workers can leave endangered places promptly and safely.

2.8. Before a workplace containing places where explosive atmospheres may occur is used for the first time, its overall explosion safety must be verified. Any conditions necessary for ensuring explosion protection must be maintained. Such verification must be carried out by persons competent in the field of explosion protection as a result of their experience and, or professional training.

2.9. Where the risk assessment shows it is necessary:

2.9.1. it must be possible, where power failure can give rise to the spread of additional risks, to maintain equipment and protective systems in a safe state of operation independently of the rest of the installation in the event of power failure,

2.9.2. manual override must be possible in order to shut down the equipment and protective systems incorporated within automatic processes which deviate from the intended operating conditions, provided that this does not compromise safety. Only workers competent to do so may take such action,

2.9.3. on operation of the emergency shutdown, accumulated energy must be dissipated as quickly and as safely as possible or isolated so that it no longer constitutes a hazard.

B. CRITERIA FOR THE SELECTION OF EQUIPMENT AND PROTECTIVE SYSTEMS

1.1. If the explosion protection document based on a risk assessment does not state otherwise, equipment and protective systems for all places in which explosive atmospheres may occur must be selected on the basis of the categories set out in Part C hereunder. In particular, the following categories of equipment must be used in the zones indicated, provided they are suitable for gases, vapours or mists and, or dusts as appropriate:

1.1.1. in zone 0 or zone 20, category 1 equipment,

1.1.2. in zone 1 or zone 21, category 1 or 2 equipment,

1.1.3. in zone 2 or zone 22, category 1, 2 or 3 equipment.

C. CRITERIA DETERMINING THE CLASSIFICATION OF EQUIPMENT-GROUPS INTO CATEGORIES

1.1. Category 1 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

1.2. Equipment in this category is intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously, for long periods or frequently.

1.3. Equipment in this category must ensure the requisite level of protection, even in the event of rare incidents relating to equipment, and is characterized by means of protection such that:

1.3.1. either, in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection,

1.3.2. or the requisite level of protection is assured in the event of two faults occurring independently of each other.

2.1. Category 2 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and of ensuring a high level of protection.

2.2. Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists or air`dust mixtures are likely to occur.

2.3. The means of protection relating to equipment in this category ensure the requisite level of protection, even in the event of frequently occurring disturbances or equipment faults which normally have to be taken into account.

3.1. Category 3 comprises equipment designed to be capable of functioning in conformity with the operating parameters established by the manufacturer and ensuring a normal level of protection.

3.2. Equipment in this category is intended for use in areas in which explosive atmospheres caused by gases, vapours, mists, or air`dust mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only.

3.3. Equipment in this category ensures the requisite level of protection during normal operation.

ANNEX IV

Warning sign for places where explosive atmospheres may occur

(Regulation 21(3))

In a place where explosive atmospheres may occur, the distinctive features are:

- a triangular shape,
 - black letters on a yellow background with black edging (the yellow part to take up at least 50% of the area of the sign).
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