

an introduction to

# ATEX

European law and the supply and use of industrial vehicles within potentially explosive atmospheres.

## Explosive atmosphere

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.

## Hazardous area

An area in which an explosive atmosphere is or may be expected.



## Explosive atmospheres in industry

Diesel and Electrical industrial vehicles are widely used at factories and sites where flammable liquids, gases, and dusts are processed or stored. Such processes include the production, storage and distribution of solvents, chemicals, pharmaceuticals, gas cylinder and aerosol filling and the manufacture of solvent based products such as paints, plastics, perfumes and cosmetics.

Explosive atmospheres may be present either as the result of an incident, or during normal operation, and may be ignited by industrial vehicles.

## Example Ignition sources

**Battery electric** vehicles may cause ignition from high surface temperatures on motors and brakes, sparks from static electricity, leakage currents, mechanically generated sparks from forks or brakes, arcing and sparking of electrical components.

**Diesel engine** powered equipment may in addition have ignition sources such as high engine and exhaust surface temperatures, flames or sparks from the exhaust or air inlet and engine overspeed.



Fork lift trucks can be the source of ignition unless suitably protected.

## ATEX Directives - European Legislation

If you supply or use equipment that may be used in potentially explosive atmospheres, then ATEX applies to you. The term "ATEX" has been adopted by industry and derives from the French **AT**mosphères **EX**plosibles.

There are two ATEX Directives, both mandatory from 1st July 2003:

- 1) ATEX 1999/92/EC applies to companies using/manufacturing flammable material.
- 2) ATEX 94/9/EC applies to companies supplying equipment for use in hazardous areas.

*1st July 2003*

## Employer's obligations



**ATEX 1999/92/EC** (also known as **ATEX 137**, or the Worker Protection Directive.)

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

### Employers obligations (overview)

- 1) Prevent the formation of explosive atmospheres in the workplace OR avoid the ignition of explosive atmospheres.
- 2) Conduct a risk assessment including the likelihood of explosive atmospheres and a source of ignition
- 3) Classify the workplaces into Zones depending on the frequency and time that an explosive atmosphere is present. A procedure that is already required by the established Framework Directive (89/391EEC).
  - Zone 0** – A place where 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 where an explosive atmosphere is likely to occur in normal operation occasionally.
  - Zone 2** – A place where an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

These zones apply to areas at risk from explosions due to gases, mists or vapours. Areas susceptible to explosions caused by dust particles are categorised as Zone 20, 21, and 22, by similar definitions.
- 4) Mark areas with signs at points of entry. (Ex sign above)
- 5) Create and maintain an explosion protection document.
- 6) Select ATEX 94/9/EC compliant equipment according to the intended Zones.

ATEX 1999/92/EC stipulates that only Category 1 equipment can be used in Zones 0 and 20; only Category 1 and 2 equipment can be used in Zones 1 and 21; and only Category 1, 2, and 3 equipment (i.e. only sufficiently protected equipment) can be used in Zones 2 and 22.

## Requirements for equipment suppliers



**ATEX 94/9/EC** (also known as **ATEX 100a, 95**, or the Manufacturers' Directive.)

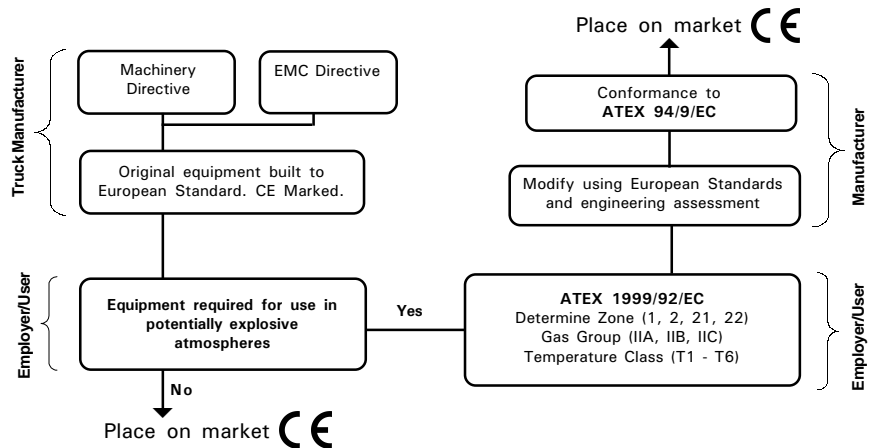
*Essential safety requirements for equipment and protective systems intended for use in potentially explosive atmospheres.*

The main purpose for the Directive is to facilitate the free movement of goods throughout the EU by harmonising the technical and legal standards to which equipment for use in potentially explosive atmospheres is manufactured.

ATEX 94/9/EC categorises equipment into three groups according to the level of protection employed, this satisfies ATEX 1999/92/EC requirements :

- Category 1 - Very high level of protection
- Category 2 - High level of protection
- Category 3 - Normal level of protection

The category number is followed by G (Gas, vapour/mist) if the equipment is modified for used in Zone 0, 1 or 2 and D (Dust) if it is to be used in 20, 21 or 22.



## Characteristics of Substances

### Flashpoint

This is the Lowest temperature at which a liquid generates sufficient vapour to support ignition.

This vapour can be ignited in many ways including temperature or energy (i.e a spark)

### Ignition Temperature

This is the lowest temperature at which the vapour will be ignited. This defines the Temperature class.

Classification of Maximum surface Temperatures of electrical apparatus (CENELEC).	Temp. Class	Max. Surface Temp. °C
	T1	< 450 °C
	T2	< 300 °C
	T3	< 200 °C
	T4	< 135 °C
	T5	< 100 °C
	T6	< 85 °C

### Apparatus Group (energy ignition)

All surface industry gases/vapours are classed as Group II gases. Group II is sub-divided into 3 sub-groups.

IIA - High energy is required to ignite. Less intense explosion.	(Propane)
IIB - Less energy is required to ignite. More intense explosion.	(Ethylene)
IIC - Little energy is required to ignite. Most intense explosion.	(Hydrogen)

### Characteristics of some common flammable materials.

Gas/Vapour	Flashpoint	Gas Group	Ignition Temp.	Temp. Class
Acetone	19 °C	IIA	535 °C	T1
Butane	-60 °C	IIA	365 °C	T2
Heptane	-4 °C	IIA	215 °C	T3
Ethyl Methyl Ether	37 °C	IIB	190 °C	T4

*Note: There is no connection between ignition energy and ignition temperature*

### Explosion protection equipment

Pyroban can provide explosion protection for almost all fork lift trucks on the market.

Satisfying the requirements of the European ATEX Directives, the Pyroban system will provide maximum safety with minimum compromise to the versatility of the truck chosen. Select the following Pyroban systems:

Zone	Solution for Diesel	Battery electric
Zone 1	<b>Euromech 2G™</b>	<b>Ex-tec 2G™</b>
Zone 2	system <b>5000D™</b>	system <b>5000E™</b>
Zone 21	<b>Euromech 3G™</b>	<b>Ex-tec 3G™</b>
Zone 22	<b>Dustmech 2D™</b>	<b>Dust-tec 2D™</b>
	<b>Dustmech 3D™</b>	<b>Dust-tec 3D™</b>

### Service

To ensure compliance with ATEX 1999/92/EC, Pyroban have a network of qualified engineers to maintain Pyroban explosion protection equipment.

Pyroban also offer various service options including an independent safety audit.

**protecting people, their investment and our environment**



For further information please contact us.

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