



A wide range of industries are at risk from flammable gas, vapours, powder and dust. BT works together with Pyroban to offer a full range of explosion protected trucks. BT and Pyroban share the same objectives: remove the source of ignition and retain the original ergonomics and performance of the truck, to let customers operate their forklift trucks safely and efficiently in a hazardous area.





The Boots accident in Nottingham, UK. This accident was the result of flammable material being ignited by a fork lift truck.



Photograph taken from the Dutch newspaper De Telegraaf. This fatal accident at Eurofill in Zaandam, the Netherlands, burnt the plant down within an hour.

## Explosive atmospheres in industries

A wide range of industries are at risk from flammable gas, vapours, powders and dusts; petrochemical, chemical, pharmaceutical, gas cylinder and aerosol filling and storage, manufacture and storage of solvents, paints, adhesives, explosives, varnishes, alcohols, perfumes, cosmetics, foods, flavours, etc. This type of companies should all be aware that there is a risk of an explosive atmosphere being generated during a normal working day.

Diesel and electric industrial vehicles are required to work in these areas but are a potential source of ignition. The consequences of ignition may be disastrous, resulting in loss of life and the destruction of a site. This means that employers have a number of obligations based on an assessment of the risks involved.

### Potential source of ignition from battery electric vehicles:

- Arcing and sparking of unprotected electrical components.
- Hot surfaces on motor and brakes.
- Sparks from static build up or friction.
- Leakage currents.
- Mechanically generated sparks from forks or brakes.

### Potential source of ignition from diesel powered vehicles:

- Flames or sparks from the exhaust system.
- Flames from the air inlet system.
- Surface temperature of the exhaust system and other components (including brakes).
- Arcs and sparks from unprotected electrical equipment.
- Sparks from a discharge of static energy or from friction.

## Employer's obligations

Due to the potential dangers, European Law, ATEX 1999/92/EC<sup>1)</sup>, sets out the minimum requirements for the safety and Health Protection of workers potentially at risk from explosive atmospheres. This means that employers have a number of obligations and in order to comply with them the truck user need to carry out a risk assessment and classify hazardous areas into zones.

1) Also known as ATEX 137, or the Worker Protection Directives.

### Employer's obligations (overview)

- Prevent the formation of explosive atmospheres in the workplace or avoid the ignition of explosive atmospheres.
- Conduct a risk assessment including the likelihood of explosive atmospheres and a source of ignition.
- Classify the workplaces into zones depending on the frequency and time that an explosive atmosphere is present.
- Mark areas with signs at points of entry (see sign below).
- Create and maintain an explosive protection document.
- Select ATEX 94/9/EC complaint equipment according to the intended zones.



# Explosive Environment

## Working areas at risk are classified into different zones.

Zone 1 and 2 are for gas/vapour environments and zone 21 & 22 for dust/powder environments.

- Zone 1 (21), for a place where an explosive atmosphere is likely to occur in normal operation occasionally.
- Zone 2 (22) where an explosive atmosphere is not likely to occur in normal operation but, if it does occur, will persist for a short period only.

## 2G (2D) modification for zone 1 (21) includes ex:

- Sparking and arcing parts are placed in flameproof enclosures.
- Standard pump- and drive motor are modified into flameproof enclosures.
- Suitable intrinsically safe electrical circuits.
- Temperature switches onto the pump-, drive and servo motor.
- Frame leakage detection device.
- Antistatic seat.
- Conductive wheels.
- Special certified battery.
- Cladding forks with stainless steel plate.

## 3G (3D) modification for zone 2 (22) includes ex:

- Enclosure of switches.
- Temperature switches onto the pump-, drive and servo motor.
- Protection to all open cable terminations.
- Sparking and arcing parts are placed in flameproof enclosures.
- Gas detection system 5000 (optional).
- Cladding forks with stainless steel plate.
- Conductive wheels.
- Special battery locking system.





- The main benefit of explosion protection of BT trucks, is that it gives the users a wide choice of the latest vehicle models to meet material handling requirements. BT has been co-operating with Pyroban since 1998 to ensure our customers receive quality equipment, safe for use in hazardous areas.
- Pyroban are the market leaders in the supply and installation of explosion protection systems.
- BT has chosen to work with Pyroban as they have dedicated development teams and 30 years of experience in this industry and use the most advanced technology to suit the application.
- A special BT production line has been established at Pyroban.
- BT has a network of specialist engineers trained on the Pyroban system to offer full support.
- BT also offers an Annual Safety Audit (ASA), provided by Pyroban, in which the integrity of the Pyroban system is checked, offering both peace-of-mind and continued compliance with the ATEX Directives. This helps reduce liability and ensures that the truck remains as safe as the day it first went into service.
- Other protection types being offered by BT in cooperation with Pyroban:
  - Specs of the military of defence
  - IP Protection levels
  - Dust Protection levels
  - Special customer demands

| <b>Zone 2 Modification time</b> | <b>weeks, approx <sup>1)</sup></b> |
|---------------------------------|------------------------------------|
| All truck versions              | 6—8                                |
| <b>Zone 1 Modification time</b> | <b>weeks, approx <sup>1)</sup></b> |
| Pallet truck                    | 9—10                               |
| Stacker                         | 9—10                               |
| Reach truck                     | 12—16                              |
| Counter-balance truck           | 12—16                              |

1) These production times are guidelines and depend on product availability and production capacity