

### **SCIENCE OF EXPLOSIONS**

### PROTECTING INDUSTRY

There is always the risk of a flammable material release in businesses that produce, store or move flammable gas, liquid or powder.

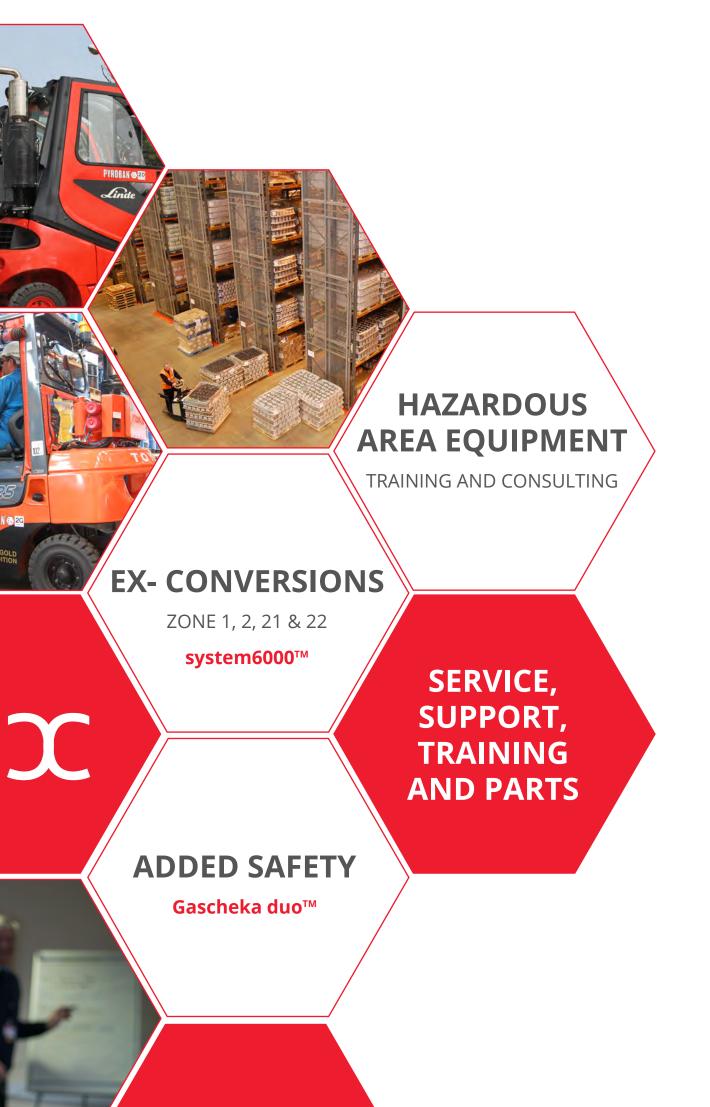
If the released gas, vapour or powder comes into contact with air and an ignition source, an explosion could happen.

The expertise of explosion protection lies in keeping these elements apart. Gas is not smart or selective and the consequences of such an ignition have been well reported over the last few years.

These incidences significantly affect people, our environment, brand reputation, share value and production levels.

Pyroban is an established leader in the provision of explosion protection solutions.





### **HAZARDOUS AREA EQUIPMENT**

### TRAINING AND CONSULTING



### **CONSULTING**

Pyroban provides expert hazardous area consulting and training to our customers. We assist customers across the world, helping to ensure that they operate safely in potentially explosive atmospheres.

#### Services include:

- Product gap analysis and equipment safety audits
- · Hazardous equipment risk assessment
- Ex equipment compliance inspections
- Design product manufacturing, certification and documentation

### **TRAINING**

Pyroban's training team provides a wide range of explosion protection training services across the world, either at Pyroban facilities, or at customers' locations.

The training courses are designed to cut through the science and vast quantity of explosion proof legislation associated with materials handling equipment, including standards and guidance, incorporated into a flexible learning experience. The courses suit all levels of the materials handling supply chain including operators, service teams and engineers.

### **EXPLOSION PROOF CONVERSIONS**

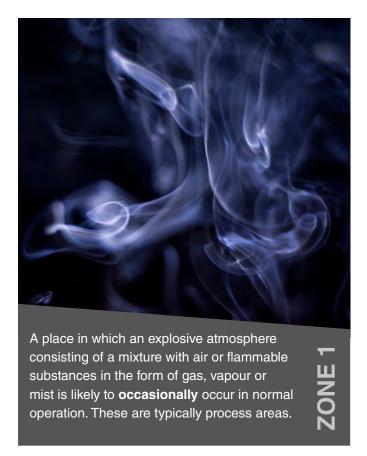


# **ZONE 1** (GAS/VAPOUR) ELECTRIC & DIESEL

Pyroban can convert almost all forklift trucks and vehicles for safe operation in Zone 1 areas. Many are standardised designs already approved by the manufacturer.

All ignition sources are protected so that the equipment is safe to use in a potentially explosive atmosphere. Conversions may include flameproof Ex d enclosures for arcing and sparking components, surface temperature limitation, Ex e components, Ex i intrinsically safe circuits, Ex m encapsulation, Ex e battery, inlet and exhaust flame arrestor and spark arrestor (on diesel engines) and cladded forks.

Converted equipment is ATEX 2014/34/EU compliant or compliant to relevant local regulations.

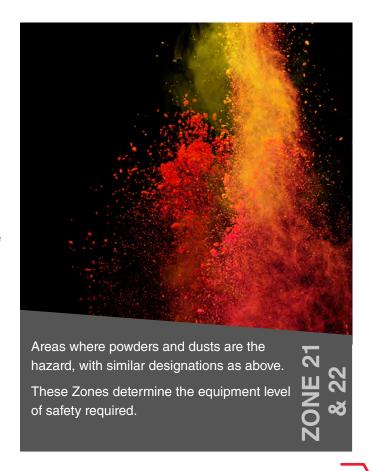


## **ZONE 21 & 22** (DUST) ELECTRIC & DIESEL

Pyroban can convert almost all forklift trucks and industrial vehicles for safe operation in Zone 21 or 22 areas. Zone 1 and Zone 2 combinations are also available. Many are standardised designs already approved by the manufacturer.

Conversions may include explosion proof Ex d enclosures for arcing and sparking components, surface temperature limitation, Ex e components, Ex i intrinsically safe circuits, Ex m encapsultaion, Ex e battery, IP enclosures, clad forks and more.

Converted equipment is ATEX 2014/34/EU compliant or compliant to relevant local regulations with the manufacturer's approval.



# **ZONE 2 (GAS/VAPOUR)**ELECTRIC & DIESEL

The most popular 'Zone 2' conversion features **system6000™**, an active system that enables the operator to be continuously informed if the operating area is safe or becoming hazardous.

system6000 includes restricted breathing enclosures for arcing and sparking components, surface temperature limitation, gas detection (option of infrared or pellistor heads) and shutdown system with audible and visible alarms, spark arrestor and clad forks.

Pyroban ensures converted equipment is ATEX compliant or compliant to relevant local regulations.

Many are standardised designs already approved by the manufacturer.







#### **Arcing and sparking components**

Electric sparks and arcs (i.e switches), mechanical sparks (i.e friction) and static electrical sparks.

See more at:

www.youtube.com | 'Pyroban Sparking Video'

2

#### **Hot surfaces**

A forklift truck has many surfaces which each individually have the risk of becoming hot and therefore sources of ignition. Surface temperature limitation ensures the engine, motors, brakes, electrics and other components remain below the auto-ignition temperatures (T Class) of flammable materials.

3

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#### Engine overspeed or flame from inlet or exhaust

If flammable gases/vapours are present in the atmosphere, the diesel engine could ingest them through the air intake. The result can be flashbacks through the inlet or backfires in the exhaust.

Overspeed can also occur when the engine ingests flammable gas mixed with air and diesel fuel which can lead to the engine running out of control at elevated speed. This can result in catastrophic failure of the engine. Another risk can be misfiring of the engine which can lead to an explosion further down the exhaust system which could then ignite the surrounding atmosphere.

### Gascheka duo™

## **ADDED SAFETY**MANAGING THE RISK

For discretionary safety areas, extended hazardous areas adjacent to formally classified Zones or for use in some hazardous area maintenance situations, Pyroban provides the added safety system **Gascheka duo™**.

Gascheka duo is a gas detection and shutdown control solution for all types of electric, diesel and LPG equipment which is supplied as a kit for on-site installation.

Gascheka duo provides visual and audible warning to operators of the presence of gas/vapour and uses either infrared or pellistor sensing technology.



These areas are not formally classified yet the risk of explosion cannot be ruled out. Typically storage and transit areas.

DISCRETIONARY SAFETY AREAS

## ENGINEERING EXCELLENCE

With more than 40 years experience delivering complex engineering solutions, Pyroban has developed a global footprint of engineering excellence to deliver high quality products across the world.

Our engineering principle is to "understand the science behind the technology" to ensure the products and solutions are fully aligned to the markets served, focused on compliance, functionality, quality, reliability and life cycle cost.





## Protecting people, their investment and our environment

