

# Explosion Proof Protection for Industrial Vehicles

*DIESEL - ELECTRIC*



**ATEX PROTECTION**

**Zone 1/21 or Zone 2/22**



**Gali** INTERNACIONAL, S.A.



# Introducing GALI

**GALI**, with more than 30 year of experience in the field, has specialised in the protection of forklift trucks and other vehicles enabling them to operate in **potentially explosive zones (ATEX)**. There are a number of industrial processes that involve the manufacture and handling of products that generate gases and dust that, when mixed with air, can create an explosive atmosphere. In this situation, any detonator, such as an electrical arc, mechanical sparks, hot exhaust gases, static electricity, hot electrical engines, etc., could provoke an explosion.

Since 2003, the European Directive 99/92/EC compels companies to define these Zones and to protect all apparatuses, installations and mobile equipment that work within them, under liability of owners, executives and heads of health and safety.

The Directive 94/9/EC, known as ATEX, specifies the requirements for all equipment sold for use in Zones defined as possible potentially explosive atmospheres.

As a specialist in the protection of industrial vehicles, **GALI** has developed its range of explosion proof protections with full guarantee of its transformations compliance with the ATEX 94/9/EC Directive and issuing the necessary certificates for each case and protection.

## Zone Definition

**INDUSTRY (II)** Three basic data are required to define the necessary protection:

### ZONE

In which there are potentially explosive atmospheres.



**EQUIPMENT**      **ZONE 20**  
**ZONE 21**            **ZONE 22**

### TEMPERATURE

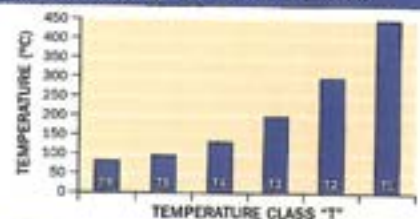
Based on the gases or dust potentially present, the vehicle should be protected to ensure it does not reach detonation temperature.

This maximum surface temperature does not depend on the classified Zone, but rather, on the gases or dust present.

CATEGORIES DIVISION			
INDUSTRIE			
	DIR. 99/92/EC	DIR. 94/9/EC	EXPLOSIVE ATMOSPHERE
GAS DUST	Zone 0 Zone 20	Category 1G Category 1D	Continuous or frequent occurrence <i>Very high level of protection</i>
GAS DUST	Zone 1 Zone 21	Category 2G Category 2D	Occasional during normal operation <i>High level of protection</i>
GAS DUST	Zone 2 Zone 22	Category 3G Category 3D	Improbable during normal operation <i>Normal level of protection</i>

### DIVISION BASED ON TEMPERATURE (gas, mist or vapours)

Class	Temperature (°C)
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85



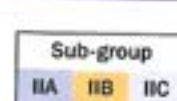
### GROUP OF GASES

The gases that can be found in the industry today are divided into three groups, based on their physical properties; for example: minimum ignition energy, etc.

### DIVISION INTO GROUPS

**MSG**  
Maximum safe gap

**MIE**  
Minimum ignition energy



# GALI protection for all kinds of industrial vehicles pursuant to the ATEX Directive



Diesel or electrical forklifts that operate in potentially hazardous zones carry the risk of provoking an explosion.

Following the ATEX 94/9/EC Directive, **GALI** is at the cutting edge of technology, offering a wide range of protections pursuant to the harmonised regulation of the Directive.

## HAZARDOUS GASES/VAPOURS

### Galitex 2G

Diesel - Electrical - Zone 1

### Galitex 3G

Diesel - Electrical - Zone 2

### Galigas

Diesel - Electrical - Zone 2

## HAZARDOUS DUST

### Galidux 2D

Diesel - Electrical - Zone 21

### Galidux 3D

Diesel - Electrical - Zone 22

## GASES + DUST

There is also the option of combined protection for Gases + Dust





## ELECTRICAL

# GALITEX category 2G or 3G (Zone 1 or Zone 2) Gases



**Galitex** protection has been developed following the rules of the ATEX/94/9/EC UNE EN1755:2000 CATEGORY 2G/3G directive.

This protection is designed to enable electrical vehicles to operate in potentially hazardous areas classified as Zone 1 & 2, with possible presence of group IIA - IIB and IIC gases and temperatures as specified.



The **Galitex** transformation includes modification of all the components, systems and equipments to comply with the ATEX directive.



Any elements that could ignite an explosive atmosphere, whether due to hot surfaces, mechanical or electrical sparks, etc., are protected and/or modified, as appropriate, by flameproof enclosures, intrinsic safety mechanisms, etc.

(Components vary substantially, depending on whether protection is CAT 2 or CAT 3).

### COMPONENTS

- Shielding boxes or enclosures.
- Explosion proof engines.
- Cladded forks.
- Ex e increased safety battery and Ex d connectors.
- Suitably protected friction brakes.
- **GALI** certificate.





**DIESEL**

# **GALITEX category 2G or 3G (Zone 1 or Zone 2) Gases**



**GALI** has developed the **Galitex** protection for electrical or diesel vehicles that work in hazardous Zones where there is a risk of explosion.

**Galitex** protection controls the temperature of both surface and exhaust gases, as well as preventing from possible flames or sparks coming from the engine's exhaust, among other things.

The transformation includes modification of the electric system of the combustion engine and all the elements that could possibly become an ignition point.

To modify the diesel vehicles (Zone 1 & Zone 2) **GALI** has developed different options on dependence of each customer real needs, thus offering more flexibility and a better price in each application.

### **GALITEX FULL**

With Ex electric starter + protection of electrical and mechanical components.

### **GALITEX AIR PLUS**

With **GALI** air starter + protection of the rest of the electrical and mechanical components.





**ELECTRICAL - DIESEL**

# **GALIDUX category 2D or 3D (Zone 21 or Zone 22) Dust**



**GALI** has developed the **Galidux** protection for electrical or diesel vehicles that work in potentially hazardous atmospheres, classified as Zone 21 & Zone 22, with the possible presence of flammable dust.

The most suitable protection is determined taking into account:



- A clear zone definition (21 or 22).
- Characteristics of the dust present in the atmosphere.
- Ignition temperature of

layer/cloud of dust.

Electrical vehicles are modified (depending on whether Zone 21 or Zone 22 protection is required), protecting the engines and electrical



equipment. Surface temperature control, stainless steel clad forks, Ex battery depending on the Zone.

To modify the diesel vehicles (Zone 21 & Zone 22) **GALI** has developed

different options on dependence of customer real needs, thus offering more flexibility and a better price in each application.

### **GALIDUX FULL**

With Ex electric starter + protection of electrical and mechanical components.

### **GALIDUX AIR**

With **GALI** air starter + protection of the rest of the electrical and mechanical components.





**ELECTRICAL** (GALIGAS option for diesel machines on demand)

# GALIGAS category 3G (Zone 2) Gases



**Galigas** protection has been developed following the rules of the ATEX/94/9/EC UNE EN1755:2000 CATEGORY 3G directive.



This protection is designed to enable electrical vehicles to operate in potentially hazardous areas classified as Zone 2, with possible presence of

group IIA - IIB and IIC gases and temperatures as specified.

The **Galigas** system prevents from the risk of explosion via a gas detection system that disconnects the equipment when necessary.

Our **Galigas** system is simple, easy to use and cost efficient.



## COMPONENTS

- Shielding for all components that could produce sparks.
- Gas detection unit with visual and acoustic alerts.
- Gas bottle for operational testing.
- Stainless steel clad forks.



# Other GALI Protections

## MINING VEHICLE PROTECTION (I)

Based on demand.

Also available on demand, following study, **GALI** protects and provides ATEX certification for industrial mining vehicles.



## NON-ATEX PROTECTION

**GALI** also offers protection for other hazards that are not classified as "Explosive Atmospheres" and, therefore, are NON-ATEX.

### GALISAFE

For electrical and diesel equipment.



## ZONE CLASSIFICATION

**GALI International** also offers an engineering and consultancy service for Zone classification and legalisation.

## Our References

AIR LIQUIDE	ICI PACKAGING
AZKO NOBEL	ICI PAINTS
BASF	IFF
BAYER	JOTUN
CEPSA	KAO CORPORATION
CEYS	L'OREAL
CITROEN	MERCK
CRAY VALLEY	NAVANTIA
DEGUSA	NOVARTIS
DSM GROUP	NOVEON CHEMICAL
DU PONT	PANREA QUIMICA
FORT	PPG INDUSTRIES
GRUPO AGA	REPSOL - BUTANO
GRUPO MORCHEN	REPSOL - QUIMICA
HEMPEL PAINTS	SUN CHEMICAL
HENKEL PULCRA	TIMAC AGRO



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