

# HAZARDOUS AREAS

Ex APPROVED EXPLOSION-PROOF PRODUCTS



THORNE &  
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INTERNATIONAL

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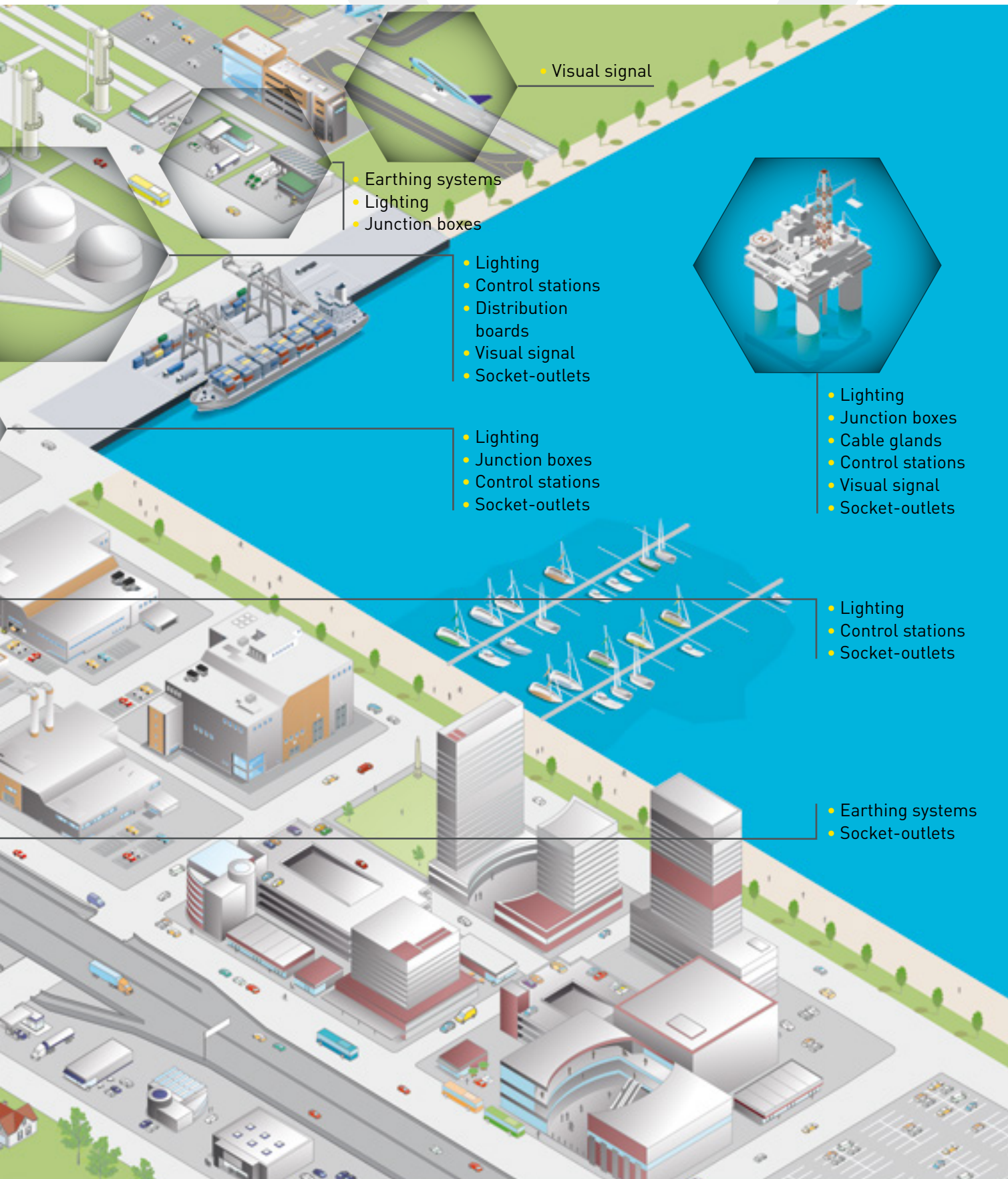


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# APPLICATIONS FIELDS

## Safety of people, equipment & infrastructure





• Visual signal

- Earthing systems
- Lighting
- Junction boxes

- Lighting
- Control stations
- Distribution boards
- Visual signal
- Socket-outlets

- Lighting
- Junction boxes
- Cable glands
- Control stations
- Visual signal
- Socket-outlets


- Lighting
- Junction boxes
- Control stations
- Socket-outlets

- Lighting
- Control stations
- Socket-outlets

- Earthing systems
- Socket-outlets

## European ATEX Directive

### → EUROPEAN DIRECTIVE 2014/34/EU

ATEX Directive 2014/34/EU is a "new approach" directive that applies to protective systems against explosions as well as all equipment used in or related to explosive atmospheres, such as electrical and non-electrical equipment, components and safety devices, control and adjustments necessary for the safe operation of this equipment and protective systems. As a "new approach" directive, the 2014/34/EU Directive defines the essential requirements for the safety and health which shall be respected by all manufacturers. Devices falling within the scope of the European Directive and responding to the essential requirements for the safety and health are identified by a marking plate on which the  logo appears.

### → EUROPEAN DIRECTIVE 1999/92/EC

The 1999/92/EC Directive aims to improve the safety and health protection of workers potentially at risk from explosive atmospheres.

The site manager has the obligation:

- to prevent the formation of explosive atmospheres or if this is not possible, prevent ignition of explosive atmospheres,
- to assess the specific risks arising from explosive atmospheres and to draw up and keep up to date an explosion protection document,
- to classify places where explosive atmospheres may occur into zones,
- to mitigate the harmful effects of an explosion to protect the health and safety of workers (install appropriate equipment, take organizational measures such as staff training, ...).

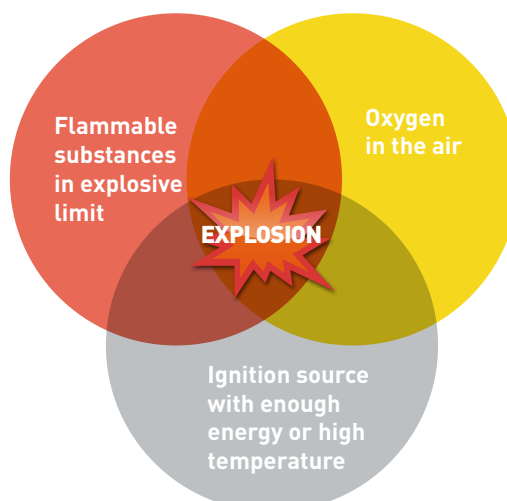
## International scheme : IECEx

IECEx Scheme: A voluntary certification scheme complying with international standards for electrical equipment only for use in explosive atmospheres.

Its aim is to facilitate the international flow of electrical equipment intended to be used in potentially explosive atmospheres (in compliance with one or more international standards defining the type of protective

against the risk of explosion) and thus avoiding multiple national certifications and at the same time ensuring an appropriate level of safety. The IECEx certification scheme allows the manufacturers of "Ex proof" equipment to obtain a Certificate of Conformity that would be accepted in Member States in which this certification scheme is recognized.

### → CONDITIONS FOR EXPLOSION



→ AREAS CLASSIFICATION DEFINED BY DIRECTIVE 1999/92/EC

Probability of ATEX presence	Very High	High and Normal	Low
<b>Definition</b>	Location where an explosive atmosphere is permanently present for long periods or often.	Location in which an explosive atmosphere occurs occasionally during normal operation.	Location where an explosive atmosphere is not liable to occur during normal operation or, if it does, is only short-lived (foreseeable abnormal operation).
<b>Zoning for gas &amp; vapors (1999/92/EC)</b>	Zone 0	Zone 1	Zone 2
<b>Zoning for dust &amp; fiber (1999/92/EC)</b>	Zone 20	Zone 21	Zone 22

→ ATEX / IEC EX CLASSIFICATION

ATEX Category	IEC protection Level (EPL)	Zone of installation	Atmosphere
1G	Ga	0	GAS
2G	Gb	1	
3G	Gc	2	
1D	Da	20	DUST
2D	Db	21	
3D	Dc	22	
M1	Ma	MINING	COAL DUST METHANE
M2	Mb		

## → GAS AND VAPORS CLASSIFICATION AND TEMPERATURE CLASSIFICATION

Gases are divided into

- three groups by IEC / EN
- four groups by the CEC (Canadian Electrical Code) and the NEC (National Electrical Code - US).

The IEC also defines different groups of gases and vapors.

The IEC and North American groups are viewed as fundamentally the same, see following table.

Gas group		Typical gas
EN / IEC	North America	
IIC	A	Acetylene
IIC	B	Hydrogen
IIB	C	Ethylene, Ethyl ether, Cyclopropane, Butadene 1-3
IIA	D	Propane, Ethane, Butane, Heptane, Acetone, Ethyl Alcohol



## → DUST CLASSIFICATION

IEC / EN defined a classification of dust:

Dust group	Definition		
	Dust type	Size	Resistivity
IIIA	combustible flyings	> 500 $\mu\text{m}$	-
IIIB	non-conductive dust	$\leq$ 500 $\mu\text{m}$	> $10^3 \Omega\cdot\text{m}$
IIIC	conductive dust	$\leq$ 500 $\mu\text{m}$	$\leq$ $10^3 \Omega\cdot\text{m}$



## → TEMPERATURE CLASSES

Self ignition temperature of the gases/vapors	T6	T5	T4	T3	T2	T1
85°C ≤ Temp ≤ 100°C						
100°C < Temp ≤ 135°C						
135°C < Temp ≤ 200°C						
200°C < Temp ≤ 300°C						
300°C < Temp ≤ 450°C						
450°C < Temp						

Equipment must never be used in an atmosphere capable of ignition at the temperature indicated on the marking (temperature class).

## Explanation of marking

Manufacturer identification:

- Name and trademark
- Address

Identification of notify body in charge of the quality surveillance (ex: **0080** = INERIS and **0081** = LCIE)

Mark for product in the scope of directive 2014/34/EU and in compliance with EHSR





Directive 2014/34/EU marking:

- II**: Equipment group = surface industry
- 2**: Equipment category
- GD**: Gas or Dust atmosphere

Conformity to all relevant European directives

Product type

Electrical parameters for a safe use of equipment

 <b>Technor Italsmea</b> <b>Via Italia 33</b> <b>20060 Gessate (MI)</b> <b>Italy</b>	   <b>II 2GD</b>  <b>Year of construction 2013</b> <b>IMQ 08ATEX028 X</b>
<b>Type AQ 8</b>  <b>380/415V 50/60Hz 63A</b> <b>Max Dis. P. 55W</b>	<b>Ex e IIC T6 Gb</b> <b>Ex tb IIIC T85°C Db IP66</b> <b>T amb. -20/40°C</b> <b>Serial Nr. :I/13/112452</b>
<b>WARNING - DO NOT OPEN WHEN ENERGIZED</b>	

European certificate number (which can be follow by IECEx certificate number ex: IECEx INE 10.0015X)

Marking for Gas according standards (\*)

Marking for Dust according standards (\*\*)

Safety WARNING

Ambient temperature range which shall be marked when different than -20°C / +40°C

* : Gas details	** : Dust details
<b>Ex</b> : Electrical apparatus intended to be installed in hazardous location <b>e</b> : type of protection (e = increased safety) <b>IIC</b> : Gas group / Subdivision C <b>T6</b> : temperature class <b>Gb</b> : Equipment protection level b (use in zone 1 and 2)	<b>Ex</b> : Electrical apparatus intended to be installed in hazardous location <b>tb</b> : type of protection (tb = protection by enclosure) <b>IIIC</b> : Dust group / Subdivision C <b>T85°C</b> : Maximum surface temperature <b>Db</b> : Equipment protection level b (use in zone 21 and 22) <b>IP66</b> : degree of protection provided by the enclosure

EHSR : Essential Health and Safety Requirements

# Presentation of most common types of protection

## → FLAMEPROOF « Ex d » EQUIPMENT

A flameproof enclosure is an enclosure in which the parts which can ignite an explosive gas atmosphere are placed and which can withstand the pressure developed during an internal explosion of an explosive mixture, and which prevents the transmission of the explosion to the explosive gas atmosphere surrounding the enclosure.

A flameproof enclosure must be able to fulfil three criteria:

- Contain an internal explosion without permanent distortion.
- Guarantee that the explosion cannot be transmitted to the surrounding atmosphere.
- Exhibit a temperature at all points on the surface which is lower than the spontaneous ignition temperature of the surrounding gases or vapors.

There are 2 construction values which make impossible for an explosion to answer to the 3 criteria:

- the flange length (L)
- the gap (i)

These values depends of gas group and the authorized maximum gap depends on the flange length.

It is necessary to lubricate the thread and to ensure that at least 5 threads are engaged for metric thread and at least 3.5 threads are engaged for NPT threads.

Holes which are not used for cable entries must be blanked using the appropriate blanking plugs.

The equipment is supplied with the joint flanges lubricated. When the equipment is installed, the path must be lubricated to keep them in good condition. Use a non-hardening, anti-corrosive grease. (see technical note) In order to successfully retain the flameproof character of the equipment:

- Care must be taken before starting up to ensure that all the screws for closing the covers and cable entries are firmly tightened and for GUB enclosure that the blocking device is well screwed.
- Modification of the original predrilled holes is prohibited.

## → INCREASED SAFETY « Ex e » EQUIPMENT

Method of protection applicable to electrical equipment such as light fittings, sockets, switches, etc, which consists of preventing the occurrence of any accidental ignition.

The construction principles for increased safety « e » equipment are as follows:

- Use of high-quality insulation materials
- Specially dimensioned clearance and creepage distance
- Electrical connection which cannot become loose
- Minimum IP54 weatherproof protection of the enclosure
- Respect of the temperature classes
- Conformity of cable entries
- Labelling.

These are created by screwing the cable gland directly onto the enclosure or, for untapped holes, by fixing with a locknut. Holes which are not used for cable entries must be blanked using the appropriate blanking plugs.

The equipment has a protection index of at least IP 54; it is therefore important to ensure that the weatherproof seal is in good condition when the product is installed.

Defective seals must be systematically replaced.

It is important to be sure that the gasket is well positioning for the plugs and sockets and for all the luminaries before connecting the male and female parts (for plugs and sockets) and before closing the light transmitting part of the lighting fixture.

For the connection, all technical note or instruction sheet shall be followed.

## → PRODUCTS MARKED « Ex de »

Equipment excepted Ex d enclosures have a combined protection type « d » and « e » technologies are the most commonly used.

Certain appliances such as power sockets, lampholders, etc, whose design creates arcs and sparks in normal operation, cannot be produced with protection mode « e » only.

- The part where the electric arc is produced is enclosed in a small flameproof chamber.
- The connection terminals are « e » increased safety.
- The assembly is mounted in an « e » increased safety enclosure.

## Cables entries

The connection of cables to the electrical equipment shall maintain the explosion protection integrity of the relevant type of protection. Where the certificate for the cable gland has an 'X' marking, this cable gland shall be only used for fixed installations. Where the equipment is portable only glands without 'X' marking shall be used.

# Installation recommendation

## → GENERAL REQUIREMENTS

Electrical installations for explosive atmosphere must comply with the requirements concerning installations in both non hazardous and hazardous locations:

- national rules (Example NFC 15-100 + condition BE3 for France),
- EN / IEC 60079-14,
- IEC / EN 60079-17.

## → EQUIPMENT SELECTION (EXCEPT CABLE ENTRIES)

Zones	Type of protection		Marking	EN/IEC standard
-	General requirements		-	60079-0
For use in Zones 1, 2	Flameproof enclosure		<b>Ex d</b>	60079-1
For use in Zones 1, 2	Increased safety		<b>Ex e</b>	60079-7
For use in Zones 0, 1, 2, 20, 21, 22	Intrinsic safety		<b>Ex i</b>	60079-11
For use in Zones 1, 2	Pressurisation		<b>Ex p</b>	60079-2
For use in Zones 0, 1, 2, 20, 21, 22	Encapsulation		<b>Ex m</b>	60079-18
For use in Zones 1, 2	Oil immersion		<b>Ex o</b>	60079-6
For use in Zones 1, 2	Powder filling		<b>Ex q</b>	60079-5
For use in Zone 2	"Non sparking"		<b>Ex n</b>	60079-15
For use in Zones 20, 21, 22	Dust atmospheres		<b>Ex t</b>	60079-31

# LIGHTING

Fluorescent // LED // Wellglass // Tank // Spot lights // Floodlights // Hand lamps

⚠ **Ex d, Ex de, Ex nA, Ex emb**

A complete range of lighting with dedicated design for hazardous areas. Manufactured either in stainless steel, marine grade aluminium and cast steel with an extra Polyurethane painting. Every single light brings excellent photometric properties.

## Fluorescent



### EVF-P.. Series

⚠ **II 2G Ex de or emb IIC T4 Gb**  
**II 2D Ex tb IIIC T85°C Db IP66**

- Copper free aluminum endings
- UV treat polycarbonate housing
- PC features made by 3 steps: inner PC, top side mirror and white and UV filter
- LOOP IN-LOOP OUT facility
- Instant restrike



### RMS.. Series

⚠ **II 2G Ex de IIC T6 to T4**  
**II 2D Ex tD A21 Db IP65**  
**T85°C to T135°C**

- 0.8mm AISI 304 stainless steel body
- 4mm Tempered glass
- Instant restrike
- Side cable entries



### GRL Series

⚠ **II 2G Ex de IIC T4 Gb or Ex de mb IIC T4 Gb**  
**II 2D Ex tb IIIC T70°C/ T80°C Db IP66**

- Body in GRP + internal frame in extruded aluminum
- 90 or 120 minutes in emergency
- CESI 15ATEX015 – IECEx CES 15.0007
- Resistance to salt water corrosion
- Low costs maintenance
- Bright lighting



### G2X.. Series Fluorescent & LED

⚠ **II 3G Ex nA IIC T6 Gc**  
**II 3D Ex tc IIIC T85°C Dc IP66**

- For zone 2 and 22
- LED up to 44W and fluo up to 2x58W
- GRP housing with UV treat polycarbonate diffuser
- High impact resistance
- Emergency version 1h or 3h

## Tank



### EVCC-PR Serie LED & Halogen

⚠ **II 2G Ex d IIC T3 Gb,**  
**II 2D Ex tb IIIC Db IP65**

- Copper free aluminum
- O-ring made of NBR
- Lamps included



### Ev.. Series Halogen & Fluorescent

⚠ **II 2G Ex d IIC Gb,**  
**II 2D Ex tb IIIC Db IP66**

- Copper free aluminum body
- Made to endure halogen or fluorescent lamp.
- Provided in a wide range of wattage

## Wellglass



### EV.. Series H.I.D.

⚡ II 2G Ex d IIC Gb or  
II 2G Ex de IIC Gb  
II 2D Ex tb IIIC Db IP66

- Copper free aluminum body
- Luminaires are made to endure in high intensity discharge lamps, MH, & HPS
- Provided in a wide range of wattage
- Option: Instant restrike



## Spot lights



### EV.. PT Series Halogen

⚡ II 2G Ex d IIC Gb or  
II 2G Ex de IIC Gb  
II 2D Ex tb IIIC Db IP66

- This type of lights are used where an high illumination is required
- Copper free aluminum



### LED EV.. Series LED

⚡ II 2G Ex de IIC Gb,  
II 2D Ex tb IIIC Db IP66

- Copper free aluminum
- free from infrared and UV wavelengths
- This type of lights are used where an high illumination is required

## Floodlights



### LED FL.. Series LED

⚡ II 2G Ex d IIB T6 Gb or Ex d  
IIB+H2 T6 Gb,  
II 2D Ex tb IIIC T85°C Db  
IP66

- Available with pole mounting and ceiling mounting
- Copper free aluminum + tempered glass
- Available with battery pack for 3h



### FL.. Series Halogen

⚡ II 2G Ex d e IIB T3 Gb or  
Ex d e IIB+H2 T3 Gb,  
II 2D Ex tb IIIC T200°C Db  
IP66

- Copper free aluminum + tempered glass
- Available in AISI316 Stainless steel
- Gasket to the lid guarantee IP65
- Available with all lamps (MH,HPS,MV,HA)
- AISI 304 Stainless steel bracket
- Option: Instant restrike

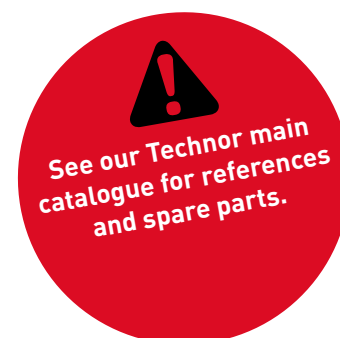
## Hand lamps



### LED EV.. Series LED & Halogen

⚡ II 2G Ex d IIC Gb,  
II 2D Ex tb IIIC Db IP66

- Portable lights with insulated handle + protection guard
- Copper free aluminum



# CONTROL STATIONS

## Increased safety // Flameproof

**Ex d, Ex e, Ex de, Ex dem**

Range of GRP, Copper free aluminium or Stainless Steel control stations designed to offer a flexible, lightweight and cost effective solution tailor made upon customer request. To be assembled with Ex de operators in case EF.. Ex de version and with PL.. operators in case of CP.. Ex d version.

## Increased safety



### EFXE Series - AISI316L

**Ex II 2G Ex de IIC Gb, Ex mb IIC Gb  
II 2D Ex tb IIIC Db IP66/67**

- Stainless steel AISI-316L
- Acid treatment
- Hidden hinges
- Custom size up to 910x1140x500mm
- From -20°C to +60°C



### EFXE Series - Aluminium

**Ex II 2G Ex de IIC Gb, Ex mb IIC Gb  
II 2D Ex tb IIIC Db IP66/67**

- Copper free aluminium
- From -20°C to + 60°C
- Custom size up to 600x600x200mm



### EFE Series - GRP

**Ex II 2G Ex de IIC Gb, Ex mb IIC Gb,  
II 2D Ex tb IIIC Db IP66/67**

- Made in GRP (Glass-fiber reinforced polyester) material
- Suited for use ON and OFF-SHORE in petrochemical and marine applications
- From -20°C to + 60 °C
- Custom size up to 405x400x120mm



## Flameproof



### CP../EFDCN.. Series - Push button stations

- **II 2G Ex d IIC Gb**
- **II 2D Ex t IIIC Db IP66**
- **II 2G Ex db IIC Gb**

- Copper free aluminum + threaded hubs
- From -50°C to +60°C (ATEX) - From -60°C to +60°C (IECEX)



### CP../EFSRC.. Series - Selector switches

- **II 2G Ex d IIC Gb**
- **II 2D Ex t IIIC Db IP66**
- **II 2G Ex db IIC Gb**

- Copper free aluminum + threaded hubs
- Connection not damage the internal void
- From -50°C to +60°C (ATEX) - From -60°C to +60°C (IECEX)



### EPKZM Series - Motor protector

- **II 2G Ex d IIC Gb**
- **II 2D Ex tb IIIC T85°C Db IP66/67**
- **II 2G Ex db IIC Gb**

- Copper free aluminum
- Used to house motor protector circuit breakers up to 63A
- From -50° to +60° - From -60°C to +60°C (IECEX)

# HARMATEX COMPONENTS

## For control station

The Harmatex components range features large push button selection, with a choice of momentary or push-push actuation modes; pilot lamps and selector switches, with plastic or metal bezel.

Harmatex range offers unrivalled flexibility with a modular design accomodating up to 6 contacts per operator head.

**These components are available for the configuration of our control stations.**

## Pushbuttons



### Flush

II 2G Ex d e IIC Gb, II 2D Ex tb IIIC Db  
IP 65 or IP66

- Metal bezel
- White, black, green, red, yellow, blue
- From -20°C to +80° C
- ITH MAX. 10A

- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Projecting

II 2G Ex d e IIC Gb, II 2D Ex tb IIIC Db  
IP 65 or IP66

- Metal bezel
- White, black, green, red, yellow, blue
- From -20°C to +80° C
- ITH MAX. 10A

- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Silicone Boot

II 2G Ex d e IIC Gb, II 2D Ex tb IIIC Db  
IP 65 or IP66

- Metal or plastic bezel
- White, black, green, red, yellow, blue
- From -20°C to +80° C
- ITH MAX. 10A

- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Mushroom Stop

II 2G Ex d e IIC Gb, II 2D Ex tb IIIC Db  
IP 65 or IP66

- Metal or plastic bezel
- White, black, green, red, yellow, blue
- From -20°C to +80° C
- ITH MAX. 10A

- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Emergency Stop

II 2G Ex d e IIC Gb, II 2D Ex tb IIIC Db  
IP 65 or IP66

- Metal or plastic bezel
- With or without key
- From -20°C to +80° C
- ITH MAX. 10A

- Unique flexibility with modular design
- Accommodating up to six contacts per operator head





## Selector switches



### Standard

⚠ II 2G Ex d e IIC Gb  
II 2D Ex tb IIC Db  
IP 65 or IP66

- Metal or plastic bezel
- Stay put/Spring return/Spring return to center/Spring return from right or left
- From -20°C to +80° C
- ITH MAX. 10A
- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Extended Handle

⚠ II 2G Ex d e IIC Gb  
II 2D Ex tb IIC Db  
IP 65 or IP66

- Metal bezel
- Stay put/Spring return/Spring return to center/Spring return from right or left
- From -20°C to +80° C
- ITH MAX. 10A
- Unique flexibility with modular design
- Accommodating up to six contacts per operator head



### Keyed

⚠ II 2G Ex d e IIC Gb  
II 2D Ex tb IIC Db  
IP 65 or IP66

- Metal bezel
- Stay put/Spring return/Spring return to center/Spring return from right or left
- Left/Right/0 Key withdrawal
- From -20°C to +80° C
- ITH MAX. 10A
- Unique flexibility with modular design
- Accommodating up to six contacts per operator head

## Contacts – NO or NC



⚠ II 2G Ex d e IIC Gb  
IP 65 or IP66

- ITH MAX. 10A
- Unique flexibility with modular design

## Pilot lights & lamps



### Lamps

⚠ II 2G Ex d e IIC Gb  
II 2D Ex tD A21 Db IP66

- Spare pilot light body white, red, yellow, blue / spare pilot light body for green
- Unique flexibility with modular design



### Plastic or metal bezels

# Ex d COMPONENTS

## Flameproof

Ex d components are available in a wide range of operators/pilot lights PL series and selectors PSRC series; allow numerous combinations with our CP./CPS.. EFDCN/EFSRC series.

PL.. series includes standard push buttons, emergency push buttons, key selector switches, pilot lights; mechanical operators allow the assembling of a maximum of four contacts.

PSRC.. series includes on-load switches, change over switches, step switches and selector customized upon request on the base of customer specification.

## Pushbuttons



### Momentary Non-Locking Locking

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

- PL.. type
- Black, red, green, blue, yellow ,white
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- fast installation and changes
- low maintenance costs



### Mushroom Twist Mushroom Keyed

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

- PLC-S / PLC-S-F / PLC-I type
- Red color
- With or without key
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs



### Mechanical Operators

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

- PLC RESTORE/PLC RESET type
- Green,red , black
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs





## Switches



### Keyed Selector

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

- PLF type
- Key withdrawal or not
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs



### On-load Switches

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

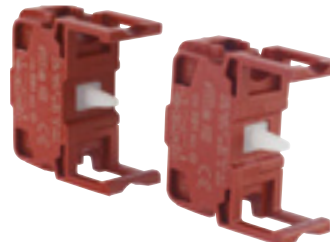
- PSRC type
- From 1 to 4 number of poles
- From 20 to 36 A
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs

## Contacts



### Normally Open

- Blue and red
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs



### Normally Closed

- Blue and red
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs

## Pilot lights & lamps



### Pilot Lights

**II 2G Ex d IIC**  
**II 2D Ex tD A21 IP66/67**

- Series lockable momentary push buttons
- PLA type/PLB type
- White, red, green, yellow and blue
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs



### LED Lamps 12 / 24 / 48 / 110 / 220V

- LED type
- red, green, yellow, white and blue
- Temperature from -50°C to +60°C
- ITH MAX. 6A
- Barrel thread : metric M32x1.5
- Compact
- Fast installation and changes
- Low maintenance costs

## SPECIFIC ENCLOSURES

Explosion group IIB+H<sub>2</sub>  
Explosion group IIC

⚠ Ex d IIB, IIB+H<sub>2</sub> and IIC

- High level of corrosion resistance
- Robust construction
- Consolidated safety product
- Highest level of achievable safety
- Ideal for extreme conditions
- Non Ex components (QPRES)

Explosion group IIB + H<sub>2</sub>



### EJB.. Series - Aluminium

⚠ II 2G Ex d IIB Gb or Ex d IIB+H<sub>2</sub> Gb  
II 2D Ex tb IIC Db IP65 or 66 or 67

- Copper free aluminum
- Suited for indoor and outdoor applications
- Screws and hardware are made of AISI316 stainless steel
- From -50°C up to +60°C
- IP65/66/67 + flanged joint coated with silicone grease



### EJB.. Series - Stainless steel AISI316L or Galvanized carbon steel (iron)

⚠ II 2G Ex d IIB Gb or Ex d IIB+H<sub>2</sub> Gb  
II 2D Ex tb IIC Db IP65 or 66 or 67

- Stainless steel AISI316 L
- Suited for indoor and outdoor applications
- Screws and hardware are made of AISI316 stainless steel
- From -50°C up to +60°C
- IP65/66/67 + flanged joint coated with silicone grease

Explosion group IIC



### Pressurized cabinets QPREX series - Stainless steel AISI316L, 304 or painted sendzimir steel

⚠ II 2G Ex pxb/pzc IIC T6 to T4 Gb/Gc  
II 2D Ex pxb/pzc IIC T85°C to T135° C Db/Dc

- Modular and adaptable system
- Customized volume up to 10m<sup>3</sup>
- Ability to mount non Ex components



## Explosion group IIC



### GUB.. Series Aluminium

 II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66

- Copper free aluminum & Stainless steel AISI316L (upon request)
- Suited for indoor and outdoor applications
- Can be equipped with different components like push buttons, rotating switches..
- From -50°C to +55°C (ATEX) – From -60°C to +60°C (IECEX)



### GUB../QL Series Aluminium

 II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66

- Copper free aluminum
- Suited for indoor and outdoor applications
- Can be equipped with different components like push buttons, rotating switches..
- From -50°C to +55°C (ATEX) – From -60°C to +60°C (IECEX)



### GUB/EMH.. Series Aluminium

 II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66

- Copper free aluminum
- Suited for indoor and outdoor applications
- From -50°C to +55°C (ATEX) – From -60°C to +60°C (IECEX)
- Window diameter from 155 to 230 mm



### CPS../EMH Aluminium

 II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66  
II 2G Ex db IIC Gb

- Copper free aluminum
- Suited for indoor and outdoor applications
- From -50°C to +60°C (ATEX) – From -60°C to +60°C (IECEX)



# JUNCTION BOXES

## Increased safety // Flameproof

### Ex d, Ex e and Ex ia

The AQ/AR range of stainless steel AISI-316L enclosure used as instrument and electrical terminal boxes, where an explosive atmosphere may be present and are especially recommended for chemical agent environments, sea-water corrosion resistance and extremes of low and high temperature, offshore and onshore oriented.

The CP./CPS.. range of copper free aluminium enclosures, used for terminals wiring, grants Ex d or Ex e mode of protection. Internal and external screws are made of AISI316 stainless steel. This series is tailor made on the base of customer specification, including quantity and type of terminals. These boxes are suitable for hazardous areas of industrial plants for indoor and outdoor applications.

## Increased safety



### AQ../AR.. Series GRP

II 2G Ex e IIC Gb / Ex ia IIC Gb,  
II 2D Ex tb IIIC Db IP66/67

- Made in GRP (Glass-fiber reinforced polyester) material
- From -50°C to +60°C



### AQ../AR.. Series Aluminium low thickness

II 2G Ex e IIC Gb / Ex ia IIC Gb,  
II 2D Ex tb IIIC Db IP66/67

- Copper free aluminum
- From -50°C to +60°C



### AQ../AR.. Series Aluminium high thickness

II 2G Ex e IIC Gb / Ex ia IIC Gb  
II 2D Ex tb IIIC Db IP66/67

- Copper free aluminum
- From -50°C to +60°C
- External hardware and screws are made in AISI304 Stainless steel
- Custom size to 332x332x178mm



### SB.. Series AISI316 L Stainless steel

II 2G Ex e IIC Gb / Ex ia IIC Gb  
II 2D Ex tb IIIC Db IP66/67

- Made of AISI316L Stainless steel
- Dimension can be customized up to 1000mm x2000mm x (depth upon request)
- Acid treatment
- From -50°C to +60°C

## Flameproof



### B2x.. Series GRP

II 2G Ex e IIC Gb / Ex ia IIC Gb  
II 2D Ex tb IIIC Db IP66/67

- From -20°C to +60°C
- 2 Sizes 120x120 mm  
160x160 mm
- Hinges Version available



### CP../CPS.. Series Aluminium

II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66  
2G Ex db IIC Gb

- Copper free aluminum + threaded hubs
- Empty housing
- Screws are made of AISI316 L
- From -50°C to + 60°C (ATEX) -  
From -60°C to +60°C (IECEX)

# CABLE GLANDS & FITTINGS

## Unarmoured cable // Armoured cable // Fittings

### Ex d/e

Single seal, double seals cable glands, suitable for unarmoured and armoured cables. Nickel-chrome plated brass, stainless steel and aluminium made, hexagon shape, anti-ageing EPDM oil resistant gaskets. These cable glands are suitable for Category II (classified Area Zone 1 & 2 and Zone 21 & 22) and category I (Mines).

### Unarmoured cable



#### Single/ Double Seal

II 2GD Ex db/eb IIC  
I M2 Ex db/eb I  
Ex tb IIIC IP66

- Nickel chrome plated brass – AISI316L-Stainless steel (other material upon request)
- Internal seal are in EPDM
- From -52°C to +110°C
- Robust
- Suitable for offshore application



### Armoured cable



#### Single/ Double Seal

II 2GD Ex db / eb IIC  
I M2 Ex db/eb I  
Ex tb IIIC IP66

- Nickel chrome plated brass – AISI316L Stainless steel (other materials upon request)
- From -52°C to +110°C
- Internal seals are in EPDM (Ethylene-Propylene diene Monomer)
- Robust
- Suitable for offshore application



### Fittings



#### Unions



#### Open elbows



#### Sealing fittings



#### Bushings



#### Nipples



#### Hexagonal plugs



#### Couplings



#### Reductions



#### Female-Female elbow



#### Adaptors

# VISUAL SIGNAL

## Warning Lights // Aircraft obstruction signals

⚡ **Ex d, Ex de IIC**

The state-of-the-art in AWL... Aircraft Warning Lights, LIOL, MIOL with LED technology, reliable long life and maintenance saving products, in compliance with ICAO and FAA, along with signalization unit like beacons, flashing unit, rotating light.

### Warning Lights



#### EV../ROT Series Rotating Signal

⚡ **II 2G Ex d IIC Gb or  
Ex de IIC Gb  
II 2D Ex tb IIIC Db IP66**

- Copper free aluminum + tempered glass
- Range of rotating lamp visual signals
- O-ring gaskets are made of NBR (Nitrile Rubber)
- The lamp is red (other colors are available upon request)
- From -52°C to +60 °C



#### EV../XN-MXN Series Xenoflash

⚡ **II 2G Ex d IIC Gb or  
Ex de IIC Gb  
II 2D Ex tb IIIC Db IP66**

- Range of xenoflash visual signals complete with Fresnel lens available in 3 different luminous intensities : 2J, 6J, 15J
- Copper free aluminum + tempered glass
- O-ring gaskets are made of NBR (Nitrile Rubber)
- The lamp is red (other colors are available upon request)
- From -52°C to +60 °C

### Aircraft obstruction signals



#### EV../WA.. series Low intensity (LIOL)

⚡ **II 2G Ex d IIC Gb, or  
Ex de IIC Gb  
II 2D Ex tb IIIC Db IP66**

- Range of low intensity aircraft warning lights, for structures below 45mt
- Copper free aluminum
- Available with halogen or LED lamp
- Halogen versions supplied with red metacrilate dome
- From -52°C to +60 °C



#### EVCC.. series Medium intensity (MIOL)

⚡ **II 2G Ex d IIC Gb  
II 2D Ex tb IIIC Db IP66**

- Copper free aluminum
- Utilizes LED technology to deliver low heat dissipation + low W consumption and up to 100.000/hours maintenance free operation
- The product is fully compliant with ICAO Annex 14
- LED included
- Lamps colors : Red, white or red and white



# EARTHING SYSTEMS

## Earthing control system

### Ex d IIC T5 Gb

Control and discharge system for electrostatic charges suitable for road tankers, rail tankers and any movable tanker for dangerous items, ready for one/two double circuit clamps PTA ISE0-2. System is complete with arrest/consensus optical warning and changeover contact free from output voltage.

The need to transfer from one place to another dangerous flammable fuels and liquids as gasoline and diesel highlighted the serious risk due to uncontrolled discharge of static charges cumulated on movable tanker-units during transfers following the well known natural phenomena when connected to loading / downloading tools (fixed).

## Earthing control system



### GUMT

#### II 2G Ex d IIC T5 Gb

#### II 2D Ex tb IIIC T100°C Db IP66

- Copper free aluminum
- System is complete with arrest/consensus optical warning and changeover contact free from output voltage
- From -20°C to +55°C
- 3 entries M20x1.5, one complete with brass nickel chrome plated plug

## Clamp



### PTA Series

#### II 2G Ex d IIC T6

#### II 2D Ex tD A21 IP65 T85°C

- Reliable, robust, handy and easy to use
- They can be easily connected to any grip, even rusty ones
- 11 mt of cable length
- From -20°C to +55°C

# PLUGS, SOCKET-OUTLETS & BOXES

## DECONTACTOR™ // Multi-contacts // Single-pole power connectors // Socket-boxes

The plugs and sockets as well as socket-outlet boxes and junction boxes in this range are meant for use in hazardous areas in compliance with the ATEX 2014/34/EU Directive and as per the IECEx in zones 1 and 2 (Gas) and zones 21 and 22 (Dust).

## DECONTACTOR™ (switch rated plug & socket)



### DXN - 20 A / 32 A / 63 A

II2 G D Ex de IIC Gb  
Ex tb IIIC Db

- Integrated load-break switch
- Robust and compact design
- High performance GRP casing
- Self-ejecting version available
- IP66/IP67 water & dust-tight



### DX - 20 A / 32 A / 63 A / 125 A / 200 A

II2 G D Ex de IIC  
Ex tD A21 IP65

- Integrated load-break switch
- Locking in on/off positions by keying axis
- Corrosion-free metal casing
- IP65 water & dust-tight



### DXA1 - 20 A

II2 G D Ex de IIC, Ex tb IIIC

- Integrated load-break switch
- IP66/67 water and dust tight
- Corrosion-free metal casing
- Lockable in connected or disconnected position with optional lockout shaft
- Low temperature rating of -55°C

## Multi-contacts



### PXN12C / DXN25C / DXN37C - 10 A

II 2 G D Ex e IIC Gb  
Ex tb IIIC Db

- From 12 to 37 contacts
- Crimp or soldered contact
- Quick and easy assembly and disassembly
- Locking in connected or disconnected position
- Corrosion-free metal casing



## Single-pole power connectors



### SPeX - 680 A

II 2 G D Ex e IIC Gb  
Ex tb IIIC Db IP65/66

- Electromechanical interlocking system
- Mechanic and visual keying
- High performance poly casing
- IP65/IP66 water & dust-tight

## Compact connectors



### PNCX - 5 A

II 2 GD Ex e IIC Gb  
Ex tb IIIC Db

- Zones 1 /2 (gas) and 21/22 (dust)
- 5 contacts
- Compact and easy to use
- Long life
- IP66/IP67 watertight (IP68 according to specification)



## Socket-boxes & Junction boxes



### MXBS / B2X - Up to 350 A

II 2 G D Ex e IIC  
Ex tD A21

- Combination of multi-contact connectors and socket-outlets on the same distribution box
- Glass reinforced, graphite-filled polyester resin enclosures
- IP66 water & dust-tight



# Configure your own Control Station

## Area of information

**ZONING**

GAS  1  21

DUST  21  22

**EXPLOSION GROUP**

IIA  IIB  IIC

**TEMPERATURE CLASS**

T4  T5  T6

**TEMPERATURE**

AMBIENT  °C -  °C UP TO +  °C

**RATED VOLTAGE :**  V

**MODE OF PROTECTION :**  EXD  EXE  EXI OTHER :

**MATERIAL :**  ALUMINUM  STAINLESS STEEL  GRP

## NUMBER OF ACTIVATOR ON FRONT SIDE :

LEGEND		REQUIREMENTS		
		OPERATOR	COLOR	CONTACTS/POLES
1	PUSH BUTTON MOMENTARY			
2	PUSH BUTTON STEADY			
3	EMERGENCY P.B.			
4	2 POS. SELECTOR			
5	3 POS. SELECTOR			
6	KEY SELECTOR SWITCH			
7	PILOT LIGHT			
8	SPECIAL SELECTOR (PROVIDE DIAGRAM)			
9	METER : TO BE SPECIFIED			
10	OTHER : TO BE SPECIFIED			

**WIRING :**  YES  NO ( DIRECT WIRING)

**ENTRY SPECIFICATION :**  METRIC  INCHES

SIZE	M20- 1/2"				M25 - 3/4"				M32 - 1"				M40 - 1 1/2"				M50 - 1 1/4"				M63 - 2"			
ENCLOSURE SIDE	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
POLY GLAND																								
METAL GLAND																								
ARMOURED GLAND																								
POLY PLUG																								

## COMPLEMENTARY INFORMATION :

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## CONTACT DETAILS

REQUEST FOR QUOTATION

NAME : \_\_\_\_\_

COMPANY : \_\_\_\_\_

EMAIL ADDRESS : \_\_\_\_\_

ADDRESS : \_\_\_\_\_

REQUEST FOR SALES ENGINEER VISIT

PHONE NUMBER : \_\_\_\_\_

FAX NUMBER : \_\_\_\_\_

COMMENTS : \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



# Lighting requirements

## Area of information

**ZONING**

GAS  1  2  
 DUST  21  22

**EXPLOSION GROUP**

IIA  IIB  IIC

**TEMPERATURE CLASS**

T1  T2  T3  T4  T5  T6

**TEMPERATURE**

AMBIENT  °C -  °C UP TO +  °C

**RATED VOLTAGE :**

VOLTAGE  V FREQUENCY  HZ

**MODE OF PROTECTION :**

EXD  EXE OTHER :

**MATERIAL :**

ALUMINUM  STAINLESS STEEL

**TYPE OF LAMP :**

FLUORESCENT  SODIUM  
 METAL HALIDE  MERCURY  
 HALOGEN  LED

**IP :**

65  66  67

**TYPE OF LIGHTING :**

1 TUBE  LANTERN/  
 WELLGLASS  
 2 TUBES  FLOODLIGHT

POWER NEEDS :  W

**MOUNTING SUPPORT :**

WALL  CEILING  POLE

**EMERGENCY VERSION :**

YES  DURATION TIME  60 MIN  90 MIN  120 MIN

**ENTRY SPECS :**

Number of Entries

Size needed  M20  M25  M32  M40

Armoured cable  Yes  No

Cable detail

**CONTACT DETAILS**

REQUEST FOR QUOTATION  REQUEST FOR SALES ENGINEER VISIT

NAME : \_\_\_\_\_ PHONE NUMBER : \_\_\_\_\_  
 COMPANY : \_\_\_\_\_ FAX NUMBER : \_\_\_\_\_  
 EMAIL ADDRESS : \_\_\_\_\_ COMMENTS : \_\_\_\_\_  
 ADDRESS : \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# Junction Box request

## Area of information

**ZONING**

GAS  1  2  
 DUST  21  22

**EXPLOSION GROUP**

IIA  IIB  IIC

**TEMPERATURE CLASS**

T1  T2  T3  T4  T5  T6

**TEMPERATURE**

AMBIENT  °C -  °C UP TO +  °C

**APPROVAL REQUEST**

ATEX  IECEx  IMMETRO OTHER :

**NETWORK INFO**

VOLTAGE  V NOMINAL CURRENT  A

**TYPE PROTECTION REQUEST**

EXd  EXe  EXi OTHER :

**MATERIAL :**

ALUMINUM  STAINLESS STEEL  GRP

**LABELLING INFO**

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**NUMBER OF TERMINAL REQUEST**

Terminal  4 mm<sup>2</sup>  6 mm<sup>2</sup>  10 mm<sup>2</sup>  16 mm<sup>2</sup>  25 mm<sup>2</sup>  35 mm<sup>2</sup>  50 mm<sup>2</sup>  70 mm<sup>2</sup>

Earth Terminal

**ENTRY SPECIFICATION :**

METRIC  INCHES

SIZE	M20- 1/2"				M25 - 3/4"				M32 - 1"				M40 - 1 1/4"				M50 - 1 1/2"				M63 - 2"			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
ENCLOSURE SIDE																								
RESIN GLAND																								
METAL GLAND																								
ARMOURED GLAND																								
RESIN PLUG																								
METAL PLUG																								

A  
 B  
 C  
 D  
 WITH CONTINUITY PLATE

**COMPLEMENTARY INFORMATION : WIRING, CABLE TYPE AND SIZE, ATTACHED DRAWINGS, TYPE OF GLAND REQUEST**

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**CONTACT DETAILS**

REQUEST FOR QUOTATION  REQUEST FOR SALES ENGINEER VISIT

NAME : \_\_\_\_\_ PHONE NUMBER : \_\_\_\_\_  
 COMPANY : \_\_\_\_\_ FAX NUMBER : \_\_\_\_\_  
 EMAIL ADDRESS : \_\_\_\_\_ COMMENTS : \_\_\_\_\_  
 ADDRESS : \_\_\_\_\_

# NON Ex PRODUCTS FOR SAFE AREA

## Industrial power supply



### DECONTACTOR™ & CONNECTORS

#### 16 A to 250 A

- DSN, DS & DN DECONTACTOR™ ranges cover applications from 20 A to 250 A.
- PNC & PN are compact 16 A & 30 A connectors design for all type of environment found in many industrial sectors.

## Signal & control



### MULTICONTACT CONNECTORS

#### 5 to 37 contacts - 5 A to 30 A

#### Low currents: 4 mA to 20 mA

- Multicontact can hook up equipment to a power supply and transmit data.
- The silver-nickel alloy used for the butt contacts provides exceptional conductivity and longevity.
- Excellent resistance, even in harsh conditions, thanks to GRP or metal casing.
- The connectors can be mounted and demounted quickly and easily.

## High current



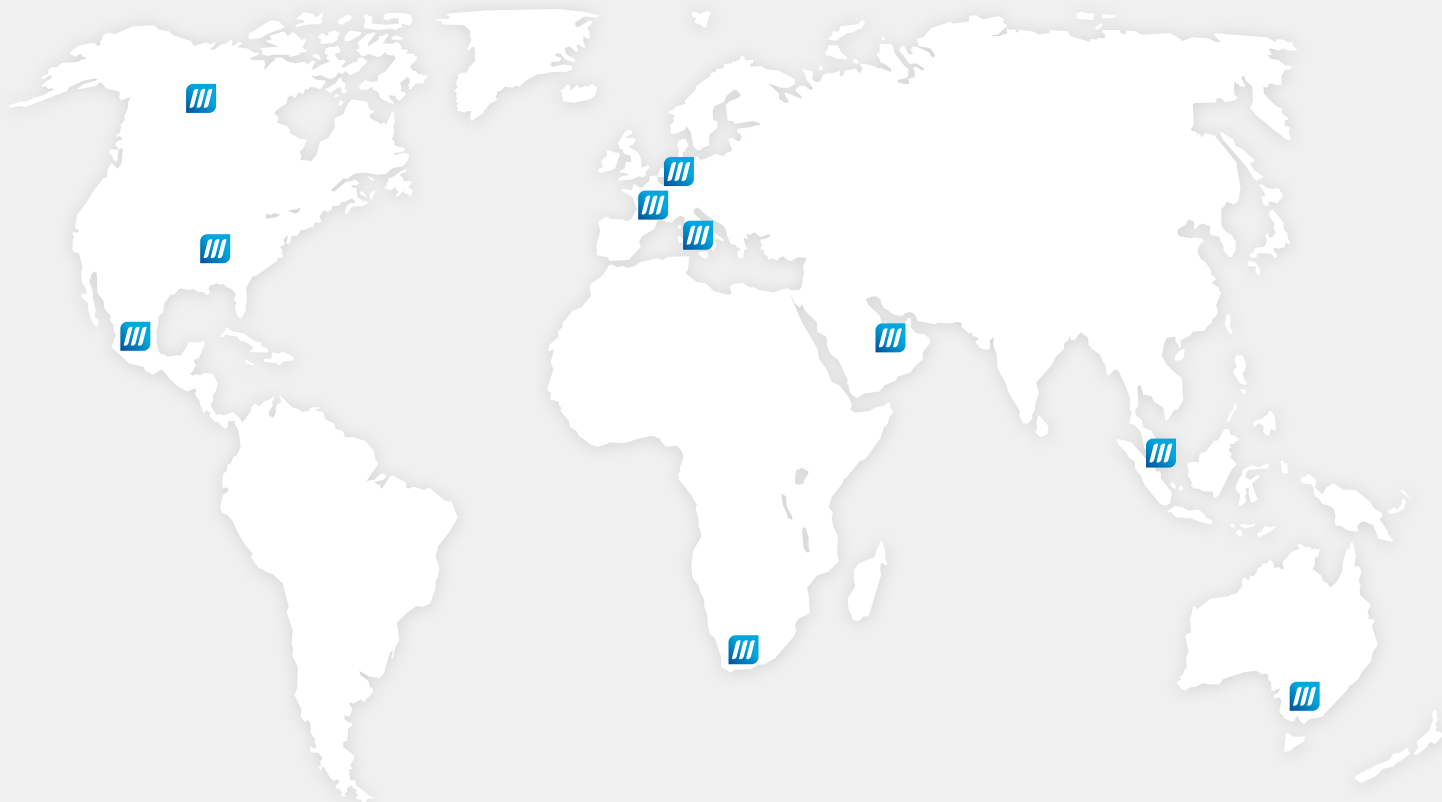
### PLUGS & SOCKETS AND CONNECTORS

#### Up to 700 A - 1 000 V

- MARECHAL® high-current plugs offer a reliable solution for connections even under the harshest environments.

#### NON CONTRACTUAL DOCUMENT AND PICTURES

All the indications appearing in this catalogue are indicative and could not constitute a commitment on our part. We reserve the right to alter specifications of our products without any prior notice in our efforts to continuously improve our products features. For your information, the most updated version is the one of our website [marechal.com](http://marechal.com).



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