

# Explosive Atmospheres: ATEX



## Zones / Equipment Categories (defined in application of 1999/92/EC directive)

Application	Zones	Explosion Risk	Authorized Equipment Category
Gas (G)	0	High: Permanent attendance	1G
	1	Medium: Casual attendance	2G or 1G
	2	Low: Rare attendance	3G, 2G or 1G
Dust (D)	20	High: Permanent attendance	1D
	21	Medium: Casual attendance	2D or 1D
	22	Low: Rare attendance	3D, 2D or 1D



## Explosion Groups

Area	Group	Reference Gas	MESG (mm)	MIE (mJ)
Mines	I	Methane	1.14	0.28
At the surface	IIC	Hydrogen / Acetylene	0.37	0.011 / 0.017
	IIB	Ethylene	0.65	0.07
	IIA	Propane	0.92	0.25

MESG: Maximal Experimental Safety Gap - MIE: Minimal Ignition Energy  
 For fl ame arresters, additional subdivisions do exist IIB1, IIB2 and IIB3 - IIB1: MESG > 0.85 - IIB2: MESG > 0.5 and IIB3: MESG > 0.65

## Type of Protection for Electrical Equipment

Gas	Zones		Codes		Protection Mode	IEC / EN standards	
	Dust	Gas	Dust	Gas		Gas	Dust
-	-	-	-	-	General requirements	60079-0	61241-0
0/1/2	20/21/22	ia/ib/ic	iaD/ibD	-	Intrinsic safety	60079-11	61241-11
0/1/2	20/21/22	ma/mb/mc*	maD/mbD/mcD	-	Encapsulation	60079-18	61241-18
1/2	21/22	d	1D	-	Flameproof enclosure	60079-1	61241-1
1/2	21/22	px/py/pz	pD	-	Pressurised apparatus	60079-2	61241-4
1/2	-	e	-	-	Increased safety	60079-7	-
2	-	nA	-	-	Non sparking	60079-15	-
2	-	nL	-	-	Energy-limited	-	-
2	-	nR	-	-	Restricted-breathing	-	-
2	-	nC	-	-	Sealed devices	-	-

\* in project

## Type of Protection for Non Electrical Equipment

Gas	Zones		Codes Gas / Dust	Protection Mode	EN standards Gas / Dust
	Dust	Gas			
-	-	-	-	General requirements	13463-1
1/2	21/22	-	d	Flameproof enclosure	13463-3
1/2	21/22	-	c	Constructional safety	13463-5
1/2	21/22	-	b	Control of ignition sources	13463-6
1/2	21/22	-	p	Internal pressurisation	13463-7
1/2	21/22	-	k	Liquid immersion	13463-8
2	22	-	fr	Flow restricting enclosure	13463-2



## Dust Ignition Temperature

Material (granulometry)	In cloud	In 5 mm layer	
Paper fiber	16 mm	570 °C	335 °C
Aluminium	< 10 mm	560 °C	430 °C
Corn starch	< 10 mm	530 °C	460 °C
Wheat	37 mm	510 °C	300 °C
Wood	60 mm	500 °C	310 °C
Sugar	30 mm	490 °C	480 °C
Polyethylene	72 mm	440 °C	No ignition (fusion)

Equipment maximum surface temperature < 2/3 x ignition cloud T\* - Equipment maximum surface temperature < ignition layer T\* - (75%)



## Gas Temperature Classes

Temperature Class	Max surface temperature	Gas or vapor (example)	Ignition temperature
T1	450 °C	Methane	595 °C
		Benzene	560 °C
		Hydrogen	560 °C
T2	300 °C	Butane	365 °C
		Ethylbenzene	431 °C
		Buta - 1.3	430 °C
T3	200 °C	Hexane	233 °C
		Heptane	215 °C
		Cyclohexane	259 °C
		Ethylether	170 °C
T4	135 °C	Ethylether	170 °C
T5	100 °C	Dehide acetate	140 °C
T6	85 °C	Carbon disulphide	102 °C

The maximum surface temperature of equipment must always be lower than the ignition temperature of the gas present in the hazardous area.

## Degree of Protection by Enclosure

First figure indicates level of protection against penetration of solid foreign objects/prevention of access to hazardous area	IP	IP	Second figure indicates the protection level against water penetration
Non protected	0	0	Non protected
Protected against solid object 50 mm Ø or more / back of hand	1	1	Protected against vertically falling water drops
Protected against solid object 12.5 mm Ø or more / finger	2	2	Protected against vertically falling drops when enclosure tilted up to 15°
Protected against solid object 2.5 mm Ø or more / tool	3	3	Protected against spraying water up to 60° from vertical
Protected against solid object 1 mm Ø or more / wire	4	4	Protected against splashing water from any direction
Dust protected / wire	5	5	Protected against jets of water from any direction
Dust-tight / wire	6	6	Protected against powerful jets of water from any direction
		7	Protected against temporary immersion
		8	Protected against continuous immersion

According to IEC / EN 60529



## Available Parker Products per ATEX zone



Zone	Coil type			
	22 mm	32 mm	37 mm	50 mm
0/20	No	Yes	Yes	Yes
1/21	Yes	Yes	Yes	Yes
2/22	Yes	Yes	Yes	Yes

## Marking

IECEx certificate No.	IECEx LC1 06.0004 X	Name of manufacturer
Reference of equipment	Parker Lucifer SA Switzerland, Geneva Type: .../495905C2	Electrical parameters
Gas marking	Un = 24 VDC ; In = 360 mA Ex d mb IIC T4	Dust marking
Temperature parameters	Ex tD A21 IP67 T 130°C Tamb. -40°C ; +65°C	ATEX marking
ATEX certificate No.	CE 0081 II 2 G D LCIE 03 ATEX 6451 X	Date of production
	D52	

## European Scheme of Certification (directive ATEX 94/9/EC)

Category	Electric / Diesel	Mechanical / Pneumatic / Hydraulic
1 or M1	EC type examination (A. III) Production quality assurance (A. IV or A. V)	EC type examination (A. III) Production quality assurance (A. IV or A. V)
2 or M2	EC type examination (A. III) Product quality assurance (A. VII or A. VI)	Internal control (A. VIII) Communicate the file to a notified body
3	Internal control of production (A. VIII)	Internal control of production (A. VIII)
or		
1 or 2 or 3	Unit verification (A. IX)	

For protection systems: Category 1 or M1



## Certification

Certification standards identical for electric equipment.  
 For an IECEx and ATEX equipment, possibility to deliver the certificates based on the same standards.  
 Audit of the quality system for IECEx and ATEX based on common requirement.

## International Scheme of Certification IECEx

Equipment examination	Production Quality Assurance
<ul style="list-style-type: none"> <li>Ex testing laboratory</li> <li>ExTR file</li> </ul>	<ul style="list-style-type: none"> <li>Ex certification body</li> <li>QAR file</li> </ul>
IECEx certificate Ex certification body	
On-lineing: <a href="http://www.iecex.com">www.iecex.com</a>	

