

ATEX Standard

ATEX - Directive 94/9/EC

European Law - ATEX Directive 94/9/EC

ATEX is named after the French "*ATmosphère EXplosible*"

Since July 1st 2003 it has been mandatory under European law, that all equipment for use in a potentially explosive atmosphere must conform to specific safety standards. Many manufacturing processes, including biodiesel production, generate potentially explosive atmospheres.

European Directive 137 - The protection of workers from potentially explosive atmospheres - makes it mandatory under European law to assess for an explosion risk and classify the area accordingly.

Hazardous areas

A professional risk assessment determines hazardous area zones

EN 60079-10 is the European Standard for determining the classification of hazardous areas, giving guidance on determining the area classification and recommendations for detailing the zones on drawings.

Zone 0 - An area where an explosive atmosphere is present continuously or for long periods

Zone 1 - An area where an explosive atmosphere is likely to occur in normal operation

Zone 2 - An area where an explosive atmosphere is not likely to occur in normal operation

Zone		Description	Equipment Category
(gases & vapours)	(dusts)		
Zone 0	Zone 20	An area where an explosive atmosphere is present continuously or for long periods	Category 1
Zone 1	Zone 21	An area where an explosive atmosphere is likely to occur in normal operation	Category 2
Zone 2	Zone 22	An area where an explosive atmosphere is not likely to occur in normal operation	Category 3

Classification of gases and dusts

Gases and dusts are classified according to their ignition properties

For gases and vapors, the gas group (explosion group) is determined according to:

MESG - maximum experimental safe gap (IEC 60 079-1A)

MIC - minimum ignition current ratio relative to methane (IEC 60 079-3)

The dangerousness of the gases increases from gas group IIA to IIC.

Temperature class is based on the auto-ignition temperature of the material

Gas group	Temperature class						
	T1	T2	T3	T4	T5	T6	
I	Methane						
IIA	Acetone	Ethanol	Diesel fuel	Acetaldehyde			
	Methane	Cyclohexane	Aircraft fuel				
	Ethane	n-butane	Fuel oil				
	Propane	n-butyl alcohol	n-hexane				
	Methanol	Propan-2-ol	Heptane				
	Toluene						
	Benzene						
	Acetic acid						
	IIB	Coal gas (Town gas)	Ethylene	Ethylene glycol	Ethyl methyl ether		
			Ethylene oxide	Hydrogen sulphide			
		Propan-1-ol	Tetra hydrofuran (THF)				
IIC	Hydrogen	Acetylene				Carbon disulphide	

Explosion group	MESG	MIC ratio relative to methane
IIA	>0.9mm	>0.8
IIB	0.5 - 0.9mm	0.45 - 0.8
IIC	<0.5mm	<0.45

MESG - Experimental vessel has an aperture of length 25mm from the inside to the outside of the vessel. Width (gap) is adjustable. MESG is the maximum gap that an internal ignition of an explosive mixture is not propagated to the exterior.

Temperature class	Max surface temperature	Ignition temperatures	Temperature class
IEC/EN	of equipment	of flammable substance	NEC 500-3
NEC 505-10	°C	°C	CEC 18-052
T1	450	>450	T1
T2	300	>300 ≤ 450	T2
	280	>280 ≤ 300	T2A
	260	>260 ≤ 280	T2B
	230	>230 ≤ 260	T2C
	215	>215 ≤ 230	T2D
T3	200	>200 ≤ 300	T3
	180	>180 ≤ 200	T3A
	165	>165 ≤ 180	T3B
	160	>160 ≤ 165	T3C
T4	135	>135 ≤ 200	T4
	120	>120 ≤ 135	T4A
T5	100	>100 ≤ 135	T5
T6	85	>85 ≤ 100	T6

Temperature class relates to all parts of equipment that can come into contact with potentially explosive atmosphere

Method of explosion protection

Method of protection	Ex Marking	Protection principle
Flameproof enclosure	d	Contains explosion & prevents flame propagation
Increased safety	e	No arcs, sparks, or hot surfaces
Non sparking	n	No arcs, sparks, or hot surfaces
Intrinsic safety	i	Limited energy of spark & surface temperature
Oil immersion	o	Ignition source kept constantly immersed in oil
Pressurized enclosure	p	Protective gas contains ignition source
Sand filling	q	Fine ground filling surrounds the ignition source so that an arc from inside the housing cannot ignite the surrounding combustible atmosphere

EX marking (gases / vapors / mists)

II 2 E Ex d IIC T3

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T3=Equipment surface temperature will not exceed 200°C

IIC=Protection in gas groups upto IIC

d=Flameproof type safety protection

Ex=Explosion-proof equipment

E=Certified to European ATEX Standard

G=Gas

2=Equipment category 2 (i.e. Zone 1)

II=Group II environment (i.e. Above ground)